

The Iron Age

A Review of the Hardware and Metal Trades.

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The International Bridge at Buffalo.

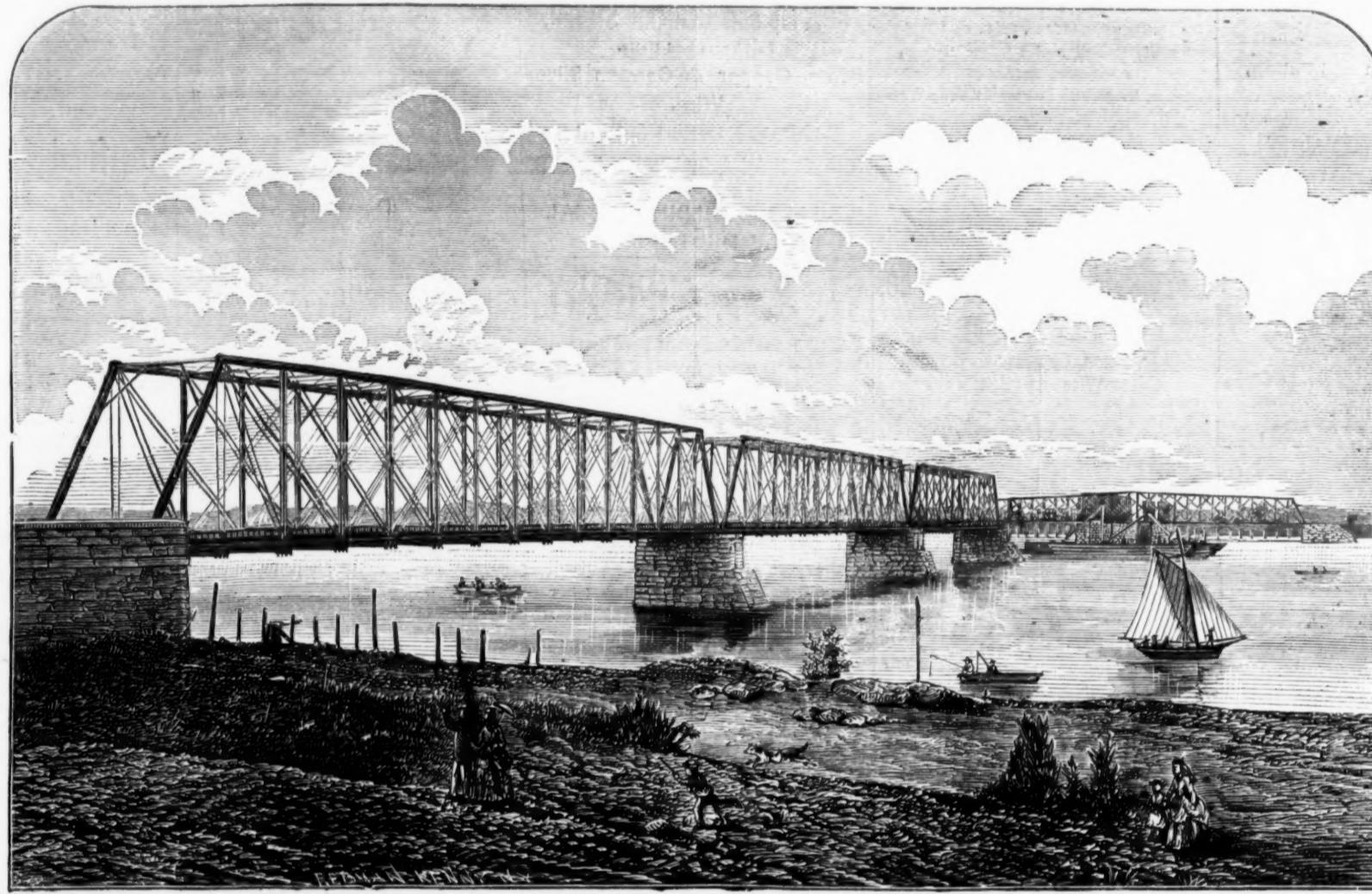
We illustrate this week a very important though not very grand looking public work, the International Bridge across the Niagara River at Buffalo, which may be briefly described as a superstructure of iron, known as Pratt's truss. The trusses consist of four main lines—that from pier to pier, the lower chord, as it is called; that parallel with it, but at considerable height above it, and known as the main chord; and counter supports at either end, on which the upper chord rests. The upper chord and end counters are tubular, put together in five pieces, with flanges. The lower chord consists of rods

Spiegel Iron Ore.

Hitherto the manufacturers of cast steel by the Bessemer process have been compelled to depend for their supplies of spiegeleisen almost entirely upon the spathose iron ores obtained in the district of Siegen, in Westphalia, and as the supplies have been somewhat limited, while the demands for spiegeleisen have been of late rapidly and extensively increasing, new sources of supply have been much sought after. Cornwall, Werdale, in Durham, the Brendon Hills, in Somersetshire, and one or two other parts of England, have yielded greater or less supplies of spathic ironstone, that from

Messrs. Hawkins & Bush, of London. The workings commenced by that firm contain three lodes of excellent red ore. They are called the Florence mines, and are being connected with the railway at South Molton station, by means of a tramway at present in course of construction. On the west of the Bampfylde Mining Company's property there is the Poltimore Sett, which embraces about 3500 acres, and has been secured by Messrs. Granger Brothers, of Glasgow. Lodes of red hematite, containing a large quantity of peroxide of manganese, have also been found on the Poltimore Sett, and workings commenced. Still further to the west, on the farm of Wal-

of carbide, so as to be of use in the carbonizing process in the Bessemer converter. We are only aware of one published analysis of a spathic iron ore containing a greater proportion of protoxide of manganese than the No. 1 Walscott, just given. It is the ore of Ehrenfridersdorf, in Saxony, the quantity of that mineral compound being 25.31 per cent., while a picked sample of the famous spathose ironstone of Musen, in the Siegen district, only yielded 17.87 per cent. of the same compound. The Walscott spathic iron ore, beside being rich in the essential constituents which go to make up a suitable mineral for use in producing spiegel iron, is also very pure, so far as sulphur and



THE INTERNATIONAL BRIDGE AT BUFFALO.

which tie the counters and verticals and resist the tendency of the upper chords to thrust the counters apart. The upper chord is that on which the roadway is hung. Transverse girders are suspended therefrom. The girders are bolted to the lower chord, and connected with the upper by an iron vertical principal. The uniform load which would necessarily fall on this vertical principal is distributed laterally by means of counter braces and rods, until it is thrown finally on the piers. The bridge has the strength of a tubular one, without its weight and other objections. Vertical and counter pieces form the sides; the tops of the vertical principals, united horizontally, strengthened diagonally, and supported by angle ties, form the roof; and the roadway constitutes the floor. The draws are turned by steam, and have various improvements adapted to the special requirements of the case. The spans are placed on the piers and when in position water is let into them and the iron truss is settled into its exact place on the piers. Three summers have been consumed in the construction of this work, which the contractor, Mr. Gzowski, declares will be completed this fall. The bridge over the river proper is slightly over 1907 feet in length, divided into seven spans of from 181 to 248 feet, and double draw of 302 feet, turning on a center pier, giving ample room for the passage of any lake craft on either side. Starting from the Canada side, there are six spans to the draw. The deepest water is beneath the fifth span, being nearly 40 feet. It is smooth rock to the Canada shore, but clay and boulders to Squaw Island, on the American side. This island is low and marshy, formed by the drift from the lake, and is crossed by a trestle-work upward of 1300 feet long. The trestle-work will be filled in with Canadian earth as soon as practicable after the bridge is finished. Crossing the trestle, we come to Black Rock

Stephenson made use of the tides to raise the tubes. Mr. Gzowski's plan is directly the opposite of that. The difficulties in building the piers for the great Montreal bridge were considered very great, but the water was nowhere more than fourteen feet deep, while here most of the piers rest on a bottom from thirty to forty feet below the surface. When, instead of a solid rock bottom, the gravel, boulders, and clay were met, it appeared as though the project would have to be abandoned. It seemed impossible to pierce through to the solid rock, but a plan was devised for doing it. The caissons were placed within coffer dams and sunk in the exact spot where the pier was to stand. A peculiar grappling dredge was set to work and picked out the boulders and other stuff.

The caisson, armed with a sharp iron shoe, gradually settled down to the hard rock. Then the concrete was thrown in and the masonry built upon that. Some curious things were dredged out from the bottom, such as an old boarding pistol, an ancient musket with bayonet fixed, the woodwork petrified; part of a dock, and a pine stump with the old axe marks on it. The bridge company is composed mainly of prominent railway men in Canada. C. J. Bridges is the president. It is not controlled by any one road, and the pronounced object is to benefit the Canadian roads by giving them an equal outlet to the States. So far the utmost fairness has been shown to lines on both sides. The New York Central, the Erie, and other local roads have secured approaches to the bridge. When finished the bridge will be of the greatest railway value. It is not an imposing work, nor will the extraordinary difficulties attending its construction show. But, nevertheless, it will be known to engineers as a remarkable work, requiring great skill, greater ingenuity, and wonderful perseverance to accomplish it.

The sum of \$70,000 has been pledged for the establishment of a knitting factory at Battle Creek, Mich.

Brendon Hills being worked and used during the last few years for the manufacture of spiegeleisen by the Ebbw Vale Iron and Steel Company. The amount of spathic ironstone worked by that company is understood to be about 50 tons per day, and the mineral is retained for the exclusive use of the company.

In a district lying about 20 miles to the west

of the mines worked in the Brendon Hills by the Ebbw Vale Company, and within a few miles of the town of South Molton, there has recently been discovered what promises to be a very large deposit of this variety of ironstone, and of very marked richness and purity. The district in question has long been known to contain lead, copper, manganese, and iron ores, some of which have been worked in former years to a greater or less extent; but it is only quite recently that very special attention has been given to the iron ores in the district referred to. Hitherto the district has lain outside the region of railways, and therefore any mineral wealth contained in it could only be developed to a very limited extent; now, however, there is in course of construction, and nearly ready for opening, a railway about 40 miles in length, running right through the district, almost due west, and joining Taunton, on the Bristol and Exeter Railway, with Barnstaple on the sea coast. The line in question is parallel to the new mining district, which lies at a distance of from three to five miles from it, and near the western boundary of Exmoor, several hundred feet above the sea level.

At least three important mineral concessions have been obtained, all of which are upon the estate of Lord Poltimore. One of them is secured by the Bampfylde Mining Company, by whom copper ore has been wrought for a number of years. They are now opening up lodes of red hematite, which is alike rich in peroxide of iron and manganese. To the east of, and immediately joining, the Bampfylde mines, there is a very large tract of ground, extending to about 5000 acres, which has been leased by

No. 1.
Protioxide of iron..... 29.62
Protioxide of manganese..... 23.37
Carbonate acid..... 32.85
No. 2.
Carbonate of iron..... 55
Carbonate of manganese..... 24

As is well known, an important element in valuing a spathic iron ore for the production of spiegeleisen is the percentage of carbonate or protioxide of iron which it contains, as it is desired that the resulting spiegel iron should contain a large quantity of manganese in the form

phosphorus are concerned. In respect of its silicious veinstuff there is nothing to complain of, more especially in the ore obtained at some depth in the lode, the silica being only about 3 or 4 per cent.

It will at once be seen that large deposits of spathic ore of such richness and purity cannot fail to exert an important influence on the manufacture of Bessemer steel in the immediate future. It is understood that the maximum productive power of the Musen mines is about 30,000 tons per annum. But Bessemer steel works have, during late years, increased greatly, both in number and extent, and the consequence is that the price of spiegeleisen has increased with the demand for it, so greatly, indeed, that within the last 10 years it has advanced from about £6 per ton to from £15 to £16 per ton, delivered free on board at Rotterdam, and were the Bessemer trade to depend exclusively upon the spiegeleisen from the Siegen district, it is questionable if there would be a sufficient supply for those Bessemer furnaces that are in operation, together with the very large number which are in process of erection in England and America. Fortunately, however, the manufacturers of Bessemer steel will soon be more favorably situated in this respect, and, therefore, we can scarcely expect that there will be any further material advance in the price of this agent of prime importance in a great metallurgical industry.

Owing to the natural conformation of the mineral district now in process of being opened up, the construction of tramways from the mines to the station at South Molton will be easily accomplished, as there is a gradual fall from the whole way. The minerals will be trucked to South Molton, and sent either west or east. It is not very probable that Barnstaple will be made the shipping port for the new mining district, as the harbor is nearly a mile from the station, and therefore the probability is that the Bristol and Exeter Railway Company, by whom the new line of railway is to be worked, will offer special rates to Burnham, near Bridgwater. That port lies opposite to, and is only about 14 miles from Cardiff, where there is an excellent harbor, and where facilities are obtainable for shipping to all parts of the world.

There has been some talk about erecting blast furnaces in North Devon, but we believe that nothing has yet been decided upon in reference to the matter.—*Engineering*.

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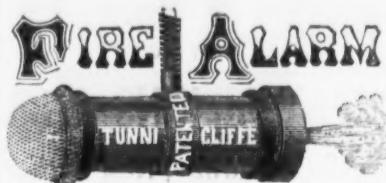
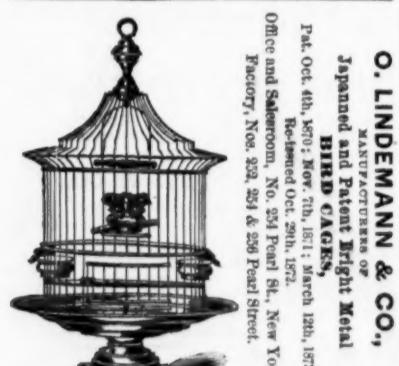


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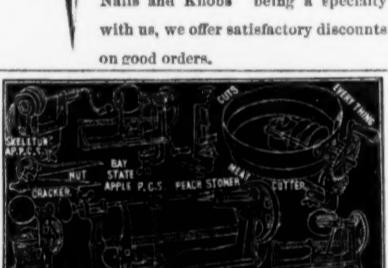
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New Patents.

We take from the records of the patent office at Washington the following specifications of certain patents lately issued, which will be found interesting:

IMPROVEMENT IN BLAST FURNACES.

Specification forming part of Letters Patent No. 139,489, dated June 3, 1873, issued to John V. Woodhouse, of Mine La Motte, Missouri.

Ordinary blast furnaces have their hearth or bottom forming part of the furnace; and in smelting copper, silver, nickel, and other metals, the lining of the furnace "burns out," and the furnace proper becomes oxidized and is rendered worthless. Frequently the furnace is "chilled" by its tuyeres becoming choked or clogged by the action of the "slag;" and similarly the bottom or hearth is rendered inoperative from the slag, and great difficulties are experienced in removing the slag and otherwise readapting the furnace. Moreover, great expense and time and labor are incurred in laying a new hearth or supplanting the old hearth or bottom when the same becomes useless. This invention has for its object the avoidance of the difficulties aforesaid by readily enabling smelters to get at the hearth, bottom, or floor inside of a cupola or stack furnace.

IMPROVEMENT IN COMPOUNDS FOR TREATING IRON, STEEL, &c.

Specification forming part of Letters Patent No. 130,335, dated May 27, 1873, issued to William A. Skinner and John E. Goodson, of Callao, Missouri.

This invention consists of the following ingredients, in about the proportions given, viz: Pulverized borax, two parts; muriate ammonia, one part and one-half; nitrate of potash, one part; prussiate of iron, one-quarter of one part. These are to be pulverized and mixed thoroughly together, when they will be ready for use.

In using this compound it is not necessary, as in the case with all others with which we are acquainted, to apply it directly to the metal to be operated upon, but only that it be placed in the fire in which the metal is heated. It desulphurizes stone-coal, and iron or steel heated in a fire containing it is freed from scales and corrossions, is refined, toughened, and softened, and the coarsest grades of metals, when heated by a fire containing the composition, are so improved in texture and quality as to be equal to the best. Used in a smelting furnace it refines the metal, and in a casting blast also renders the castings more smooth and tough than usual. Cast-steel heated in a fire containing the compound can be worked and welded without any external application, will bear a much higher heat without injury than it would without it, and will bear hammering at a heat that it could not possibly bear in ordinary fires.

In an ordinary blacksmith's forge it is used as follows: While the fire is in full blast draw back the burning coals and place a package containing about two ounces of the compound immediately below and in front of the nozzle of the bellows-pipe; then throw the fire back immediately and proceed to work the fire, as usual. Cast-steel heated to a borax heat and hammered, as usual, will readily weld without the necessity of the direct application of borax or any other chemical compound or ingredient.

This compound sprinkled or dusted over stone coal, when used in stoves, furnaces, blast, or any and all other places where stone coal is used for heating for any purpose whatever, will, by desulphurizing and cleansing the coal, protect the stoves, furnace grates, &c., thereby increasing their durability, and protecting them from the effects of burning coal.

1. A compound, substantially as herein described, for use in the fire, but

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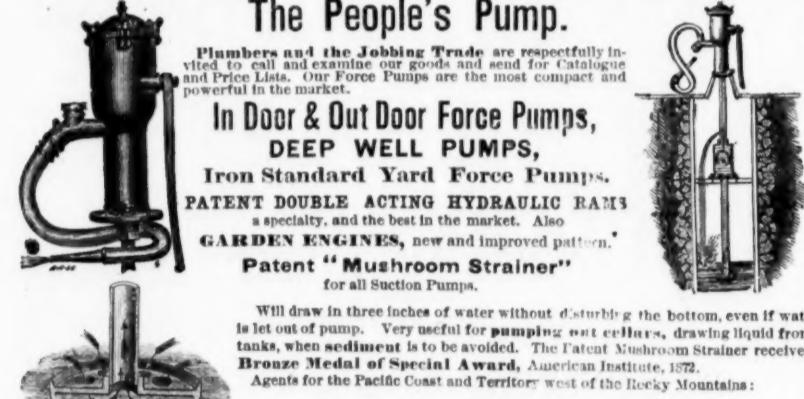
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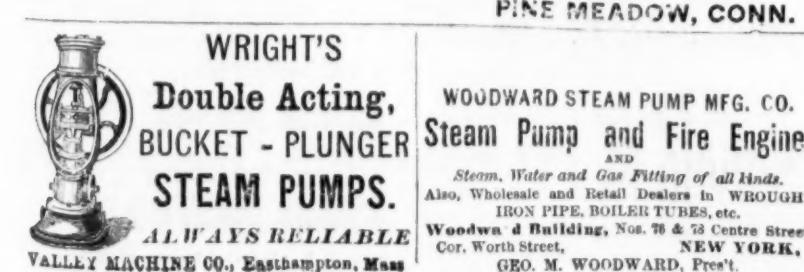
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The hearth is 8 feet in diameter for the same vertical height; the section is then uniformly enlarged to the boshes, which it reaches at 25 feet vertical height in No. 1, and 28 feet in No. 2. It then remains constant for a distance of 10 or 12 feet above them, after which it gradually contracted to a width of 10 feet at the top in No. 1, and 12 feet in No. 2. The walls of the stack are composed of brick, varying in quality from the best fire brick to common red brick, and enclosed by an exterior casing of plate iron, the whole system resting upon a cast iron ring or entablature, supported by eight cast iron columns without the intervention of girders. The extreme diameter of the sole plate upon which the columns rest is 27 feet, and its surface is upon the level of the surface of the hearth stone.

The lower part of the hearth is encircled upon the outside by a hollow cast iron ring, through which water constantly circulates; this is termed the "water basket." Its office is to cool the hearth walling, and to prevent the passage of any molten iron through the joints of the brickwork. The dam plate is cooled in the same manner. The upper part of the hearth and the lower part of the region of the basket are strengthened by cast iron rings and other castings.

The throat of each furnace is surrounded by an overhanging charging platform of plate iron, supported by brackets, and connected with each other by a bridge of the same material resting upon girders. The charging apparatus consists of the cup and cone arrangement, to which the latter is raised and lowered by the agency of blast from the main. The hot gases are taken off at the side of the furnace just below the cup and cone, by a horizontal rectangular flue leading into a vertical main, through which they are brought down to the hot blast apparatus.

The hot blast main, where it encircles the furnace, is supported by brackets fixed to the sides of the columns. A branch pipe to the tuyere is led off between every two adjacent columns except in front. The number of tuyeres in use is seven for each furnace, which are now provided with five-inch nozzles. The frame in which the flow-pipe is set is cast at the works, being composed of a body of cast iron surrounding a coil of pipe through which, when in use, water constantly flows.

Between the furnaces, and at a height of 30 feet above the hearth level, is a large rectangular receiving tank, with rounded ends, 30 feet long, 6 feet high, and 5 feet wide, into which the water supply is pumped direct from the river. By means of overflow pipes it is then led to the distributing reservoirs situated immediately beneath. These are plain cylindrical tanks, four in number, 8 feet in diameter, and 10 feet high, and are supported by girders whose ends are fixed to the casing of the furnaces, and whose centers are upheld by columns, and braced by longitudinal arched pieces. They, as well as the large upper tank, are constructed of plate iron.

THE CASTING HOUSE

is situated in the rear of the hot blast stoves, and at a distance of 10 feet from them, its level being 10 feet below that of the furnaces. It is constructed of wood with slate roof, the side nearest the furnace being covered with corrugated sheet iron, and is 240 feet long, 75 feet wide, and 32 feet high. The ore and coke stacks which traverse it longitudinally, are elevated on trestle work at a height of 12 and 18 feet from the floor. In the southwestern corner limestone and cinder are stocked, and ore in the southeastern. Underneath the coke track, and occupying the entire north side of the house, is a series of coke bins holding 1500 bushels each, provided with shutes at the bottom, and screening bars for the removal of fine material. The coke cars are emptied direct into these, being made to discharge their contents at the bottom.

There being a considerable length of trestle-work elevated at a considerable height above the surface, extending from each side of the stock-house to the main line of the railroad, ample room can be had for stocking purposes outside.

To the west of the casting house, and separated from it by an interval of 20 feet, is

the stock house

are led by transverse ascending flues, 24 inches in width, into an arched combustion chamber, the supply of air to which can be regulated; from this they pass through flues in the roof into the heating chamber. Both of these chambers are lined with fire brick—the exterior of the oven is of red brick, and is well braced, and bound together with tie rods. The roof is cast iron, so constructed that it can be readily removed when it is desired to take out any of the U pipes.

The cold blast passes in at the back, and emerges at the front, heated to a temperature of about 900 Fahr. The main horizontal gas-flue, and all branch flues, become in time nearly choked up with fine white fume or dust, and it becomes necessary to clean them out thoroughly about twice a year.

HOISTING OF MATERIALS

is accomplished by means of two pneumatic lifts, one for each furnace. They are located in the rear of the furnaces between the two groups of ovens, their base being on the general level of the stock house (10 feet below that of the furnaces), and accessible from it. Each consists of a simple cylinder of cast iron, 92 feet long and 36 inches in diameter, made in lengths and bolted together and bored throughout—in the interior of which is a loosely fitting piston with balance weight. The cage surrounding the cylinder is provided with two platforms, one on each side of the cylinder, and is connected with the piston by two wire ropes one inch in diameter, fastened to the center of the cage on each side, which pass over pulleys at the top of the cylinder. It is also provided with wheels running on iron guides on the surface of the cylinder. The hoist is worked by admitting air from the blast main into the cylinder alternately at the bottom and top, by means of valve, without the use of air pump.

At each ascent, a barrow containing 500 lbs. of coke, and one containing 900 lbs. of ore or lime-stone, are taken up. One hundred and twenty trips are made per day with each lift. The actual time required for putting the loaded barrows upon the cage, raising them to the top, emptying them, and returning them to the bottom, is about 1 minute and 40 seconds.

These lifts have thus far worked with great regularity, requiring no repairs.

THE STOCK HOUSE

is situated in the rear of the hot blast stoves, and at a distance of 10 feet from them, its level being 10 feet below that of the furnaces. It is constructed of wood with slate roof, the side nearest the furnace being covered with corrugated sheet iron, and is 240 feet long, 75 feet wide, and 32 feet high. The ore and coke stacks which traverse it longitudinally, are elevated on trestle work at a height of 12 and 18 feet from the floor. In the southwestern corner limestone and cinder are stocked, and ore in the southeastern. Underneath the coke track, and occupying the entire north side of the house, is a series of coke bins holding 1500 bushels each, provided with shutes at the bottom, and screening bars for the removal of fine material. The coke cars are emptied direct into these, being made to discharge their contents at the bottom.

There being a considerable length of trestle-work elevated at a considerable height above the surface, extending from each side of the stock-house to the main line of the railroad, ample room can be had for stocking purposes outside.

To the west of the casting house, and separated from it by an interval of 20 feet, is

THE BOILER HOUSE

which is 79 feet wide, 85 feet long, and 35 feet high, built of brick, with roof of iron and slate. It contains 12 boilers in batteries of four each. These are plain cylinders, 42 inches diameter and 64 feet long, provided with mud valves and steam drums, and supplied by two No. 5 Cameron pumps, in connection with two Stillwell heaters, which raise the water to a temperature of 200° Fahr., before delivering it into the boilers, causing a great economy in the generation of steam, and also purifying the water. The boilers are heated by the waste gases without the use of coal. After performing this work the gases are led through converging flues into the main stack, which is 10½ feet in diameter and 112 feet high. It is lined with fire-brick and faced with boiler plate.

Immediately adjoining the boiler house, but separated from it by a wall, is

THE ENGINE HOUSE

40 feet wide, 97 feet long and 40½ feet high, built of brick, with arched doors and windows, and ornamented like the casting house. The roof trusses are of wood, the cover of slate. It contains six vertical direct acting engines, built by MacIntosh, Hemphill & Co., of Pittsburgh, situated 14 feet 6 inches apart from center to center, and working entirely independent of each other. They have the following dimensions:

Diameter of blast cylinder..... inc' es 84

" " steam " " 33

Length of stroke..... feet 4

No. of revolutions..... 19

Diameter of fly wheels..... feet 14

Only 4 of these engines are at present used together. At 19 revolutions each gives 5848 cubic feet of air per minute. The blast cylinders are placed above the steam cylinders, being supported by cast iron standards bolted down to the east iron bed plate. They are provided with poppet valves. The slide valves of the steam cylinders are of peculiar construction, the subject of a patent by the makers. The cross head is between the two cylinders, and is connected at each extremity with a 14 foot fly-wheel, placed outside of the standards.

The blast from the cylinders is led by branch pipes to the main, which is four feet in diameter; through this it passes to the rear of the hot blast ovens, where are valves for controlling the admission of air into each furnace. The six engines are placed side by side in one line, and present a very fine appearance. It is claimed that they are far more effective than one or two engines of large size with the same aggregate power would be, and their use is attended with many advantages. They give a very uniform pressure of blast, requiring no regulators, and work with great regularity, producing little or no noise or concussion. In case of an accident to one no stoppage of the furnace is necessary. They are also less expensive, as five or six of them do not cost more than one engine of large size and massive construction. The patterns for one will serve for any number in addition; they require no heavy foundations, and are easily made and put together.

THE WATER SUPPLY

Is obtained from the river. Two large Cameron pumps (size No. 7x8, diameter steam cylinder 16 inches; length of stroke, 3 feet; diameter of inlet pipe, 12 inches; diameter exit pipe, 10 inches) are provided for this purpose. They are placed in a pump house near the river, one being 11 feet above the other. The upper one is used when the river is high, the lower when it is low, only one being used at a time. The water is forced into the large receiving tank between the furnaces, before described.

Connected with the works is a carpenter and repair shop, 105 feet long, 32 feet wide, and 30 feet high, built of wood and covered with corrugated sheet iron; a blacksmith shop, 40 by 32, built of brick, with iron roof; also fire-clay and other sheds. A chemical laboratory is also in connection with the works.

The company has a rolling stock consisting of one heavy and one light locomotive, 66 flat cars and 53 coke cars.

Between 800 and 900 tons of metal are produced weekly, the greater part of which is produced "foundry" iron.

The extensive coke works belonging to this company are situated near the eastern terminus of the W. P. R. R. in Westmoreland county, just across the Conemaugh River from Blairsville, Indiana county, at a distance of 60 miles from the blast furnaces. At this point

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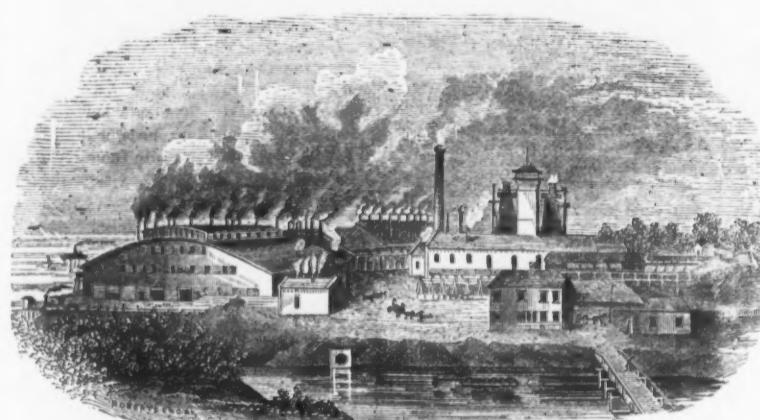
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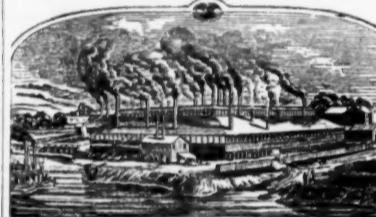
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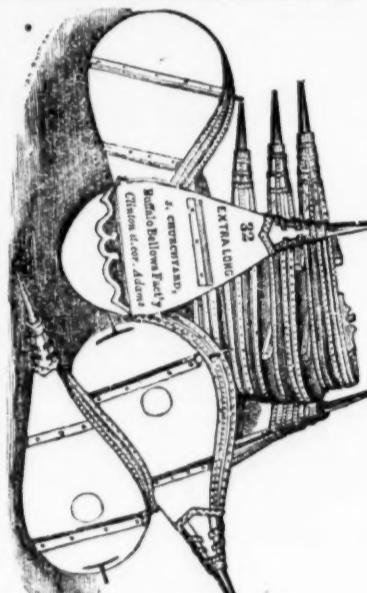
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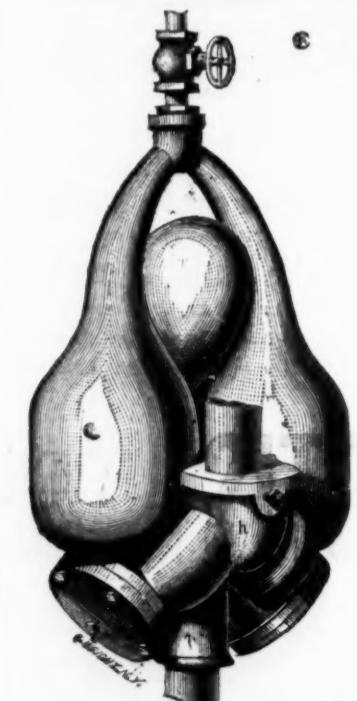
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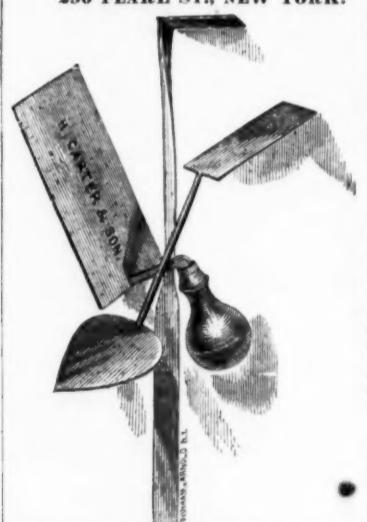
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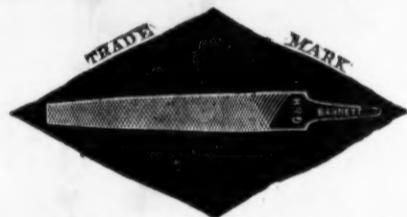
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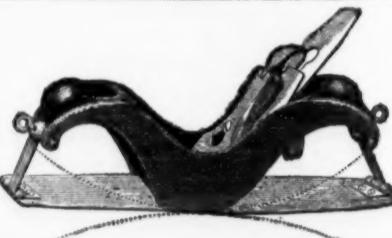
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Something New for

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New Union Steam Safety Elevator,

How One Works.

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Dear Sirs: The experience of a year proves that your Furnace Elevator is superior to all others in use. We have in the six weeks from December 1st to Sunday last, 12th inst., made 2724 tons, 1401 lbs. "pig metal," or an average of near 65 tons per day, which required the elevator to lift 140 tons material in the 6 weeks. The largest yield in one day was 81 tons iron, including the lift, and the greatest load ever lifted in one hour. This is a record not easily duplicated, and that, too, in the greatest weather we have had. Other furnaces with water and pneumatic hoists have experienced great difficulty, on account of the water freezing in the tanks; and in the case of the air hoists, we understand that two furnaces, not far from us, had to "blow out," from being unable to hoist steel during the "cold snap." The difficulty, we are told, was caused by the condensed moisture in the blast freezing to the sides of the cylinders, so that the piston could not move up or down. Very truly yours,

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Weighmasters' Beams and Frames. Trucks of all varieties.

All descriptions and sizes of these articles are made by the

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The Scales made by this Company possess valuable patented improvements over all others. They have taken more first-class Premiums than all others during the past ten years. The Brandon Manufacturing Company guarantees all goods made by them to prove satisfactory and superior to any other make.

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Black River, Independence and Berea Grits.
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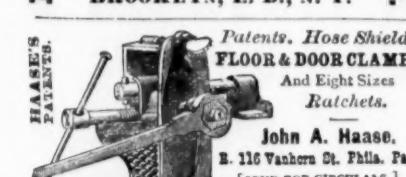


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THE STANDARD MAKE!
Emery Wheels and Emery Grinding Machinery.
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Iron Founders,
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Ford's Pat. Stove for Heating Air for Blast Furnaces

Adopted at 13 different Furnaces.

West Point Foundry,

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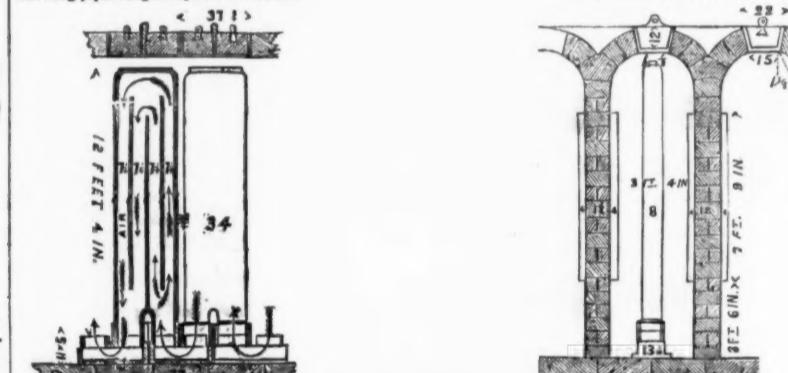
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30 BROADWAY, NEW YORK, sole Proprietors for the United States

JOSEPH CRAMPTON, Agent.

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Showing pipes lengthways in one section.



REFERENCE.

PHILADELPHIA, NOV. 16, 1872.

PAULDING, KEMBLE & Co.:

GENTLEMEN: We have five sections of the "Ford's" Ovens in use since blowing in our new Furnace on the 1st of October. The Ovens have given entire satisfaction: we consider them superior to any Cast Iron Oven in use. They heat the air to a greater degree with much less gas and heat on the brickwork than the Player Ovens; they cost less for construction, and, we believe, will prove more durable, and less expensive to keep in repair. Our main difficulty thus far has been to keep the heat down to 1000 deg.; our average is from 1100 to 1300 deg.

In all cases the Cast Iron Key Boxes to form the arch should be filled in lightly with fire-brick blocks, laid dry and covered with loam, or, better, a cast iron plate, to cover the top, with a ring in it, so as to be easily removed.

We built our ovens in one block, entirely of fire-brick; the cost of the brick work entire was about 5000 dollars, say about 1000 for each oven.

We put 4 courses of fire-brick in the bottom, laid on a loose slate rock, laid dry, and well grouted each course with Kaolin grout.

We can recommend the Ford Ovens with great confidence to iron men who wish to construct the best kind of ovens in use in the United States. Yours, truly,

J. B. MOORHEAD & CO.

P. S.—Our Furnace is now on her 3d week, making about 28 tons per day good Foundry Iron—15 feet bosh, 50 feet high.

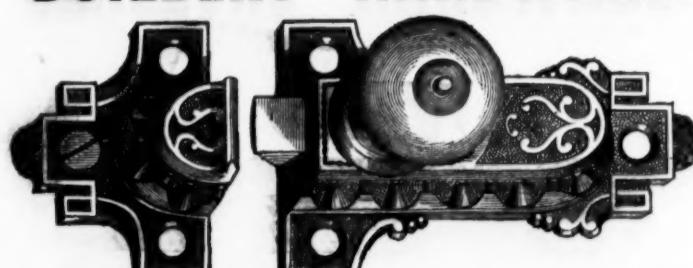
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Cupboard Catches, Sash Fasteners, Drawer Pulls, STORE DOOR HANDLES, etc., in great variety.

Send for our new Catalogue and Price List.

BUSINESS ITEMS.

NEW YORK.

Syracuse is engaged in a novel manufacturing enterprise, one firm there now constructing no less than seven mammoth windmills as large as the enemies of Don Quixote. The mills are designed for crushing gold ore, and are to be sent to the Island of Oruba, in the Caribbean Sea. The prevalence of trade winds in that section, and the high price of fuel, have induced the quartz crushing company to introduce windmills for ore crushing purposes. An accurate idea of the size of these powerful agents may be conceived from the following dimensions: The diameter of the wheel, which is of the "rosette" pattern, is 36 feet, thus securing power equal to a 20 horse-power engine. The weight of each mill is about 9000 pounds, the cost of construction being about \$1000 each.

PENNSYLVANIA.

The foundry of Lewis & Rossetter, in Pittsburgh, was burned on Saturday, July 12. Loss about \$30,000. A number of tenement houses adjacent were also destroyed, with five horses. Total loss about \$50,000.

MISSOURI.

A company, mainly composed of Eastern gentlemen, with valuable Missouri ore beds under their control, have purchased ground in St. Louis for the erection of a large blast furnace, to cost about \$60,000. The company is composed of S. E. Blair and J. L. Ames, of New Jersey, H. M. Norton, of Pennsylvania, and two silent partners from Illinois. The erection of the furnace will be commenced at once.

Work on the bridge over the Mississippi, at Louisiana, was commenced July 4. A large amount of material has already been placed on the ground by Messrs. Reynolds & Saulpaugh, of Rock Island, Ill., who have the contract for the substructure and approaches. The iron work, which is to be furnished by the Kellogg Bridge Company, of Buffalo, and the Keystone Bridge Company, of Pittsburgh, is well under way. The company intend to have the bridge completed by next December.

WISCONSIN.

The Howard Foundry and Machine Works cover two acres of ground at Fort Howard. The main shop is 100x75 feet, and the foundry is 40x75 feet. The stock of patterns in the two large pattern shops is worth from \$40,000 to \$50,000. The company makes mill machinery of all kinds, and during the four years it has been in business has built 14 engines and fitted up four blast furnaces. It is making extensive docks along the river front, and is about to build a new brick pattern shop. About 40 hands are employed.

MICHIGAN.

The first consignment of cars to England has been shipped from Montreal by the Dominion line of steamers. It consisted of three parlor cars and three sleepers, which were built in the company's shops at Detroit, and so constructed as to be perfectly ready to be built on their arrival in England. They are shipped in cases by sections, the sills and long timbers strapped together. On arriving at Liverpool they will be conveyed to the Midland Company's shops at Derby, and there built under the supervision of Mr. A. B. Pullman and Mr. Longstreet, mechanical superintendent of the Pullman Company, who will take out a corps of men from the Detroit shops. Everything is ready except the wheels. The English roads use a larger wheel than can be procured here, and hence the necessity for procuring them in England.

The Detroit Steam Forge of I. N. Ford & Son employs 45 hands and makes a specialty of car axles. The firm will do a business the present year of \$180,000. The works are partially run by an engine of 30 horse-power, made in Sandusky, Ohio. They have also in the works 4 smaller engines, and 4 boilers to run exclusively 4 steam hammers of great power. The boilers were made by the Detroit Locomotive Works, at Detroit, the Cuyahoga Works, at Cleveland, and by Dessotelle & Hutton, at Detroit. They melt fully 2000 tons of scrap iron a year, also large quantities of pig. The yearly pay roll will amount to \$22,000.

NEW JERSEY.

James H. McGuire's foundry, at Trenton, gives employment to 26 men, and turns out over \$60,000 worth of work per annum.

McFarland, Sample & Evans, of the Novelty Iron Foundry, Trenton, make a specialty of light castings, such as iron railings for gardens and churches, as well as other fancy ornamental work.

DELAWARE.

A fire-proof stove for use in passenger cars, especially, was subjected to a severe test in Boston, recently. The stove is made of wrought and malleable iron. It is circular in form, composed of three upright cylinders and two cold air boxes at the bottom. The fuel is placed in the inner cylinder. The cold air rushing through the cold air boxes drives hot air outward and upward through the cylinders, the rounded form giving a very powerful radiation.

The heat escapes through a register in the back. The whole is firmly bound together by strong iron bolts. The doors are fastened by patent locks. At the trial the stove, after the fire in it was well under way, was thrown from the staging upon which it was placed, to the ground, a distance of six feet. It was then rolled about, tumbled over and over, but not a spark of the fire was spilled upon the shavings which were scattered around. When the stove-door was opened the fire was burning briskly. This ingenious apparatus was invented and manufactured in Wilmington.

KANSAS.

The rolling mills which were established at Topeka, by Royal M. Bassett, of Connecticut, last spring, in consideration of \$150,000 in bonds being voted by that city in aid of the enterprise, were to have been moved to Kansas City, July 7. The machinery was loaded upon a train and pushed out upon the track, but, just as the engine was about to pull out, Sheriff Thomas served an injunction against their removal, and the rolling mill had to be rolled back again. The affair will doubtless cause trouble and litigation. The citizens claim that the bonds were voted in good faith, and that they are not responsible for the decision of Judge Dillon, which rendered them worthless.

OHIO.

The actual condition of the trade during the first quarter of 1873 is fairly indicated by the following extracts:

Imports.	Exports.
France.....	2,843,000
Pig iron.....	1,346,000
Bar iron.....	624,000
Brass.....	33,000
T and angle iron.....	1,500
Sheet iron.....	361,300
Tinned and other plates.....	346,000
Thin sheet.....	7,374
Iron wire.....	53,800
Steel, in bars.....	1,000,900
Steel, sheet.....	159,800
Steel, sheet, thin.....	23,300
Steel, wire.....	nil
Copper, pure, first fusion.....	7,633,900
Copper, beaten or rolled.....	59,700
Copper wire.....	nil
Brass, first fusion.....	46,300
Brass wire.....	nil
Lead ores.....	340,800
Lead in pig, etc.....	3,548,800
Tin in mass.....	3,099,300
Zinc, first fusion.....	45,500
Zinc, first.....	3,574,800
Zinc, rolled.....	6,000
	158,200
	88,500
	158,200
	490,500

Unfortunately the details are not given comparatively, but we find that the export of rails is much reduced, while the imports show an augmentation of 5 millions for the quarter; and the high prices maintained by the French ironmasters having tended to that result, by these means the stock in hand grew in amount, and prices fell.

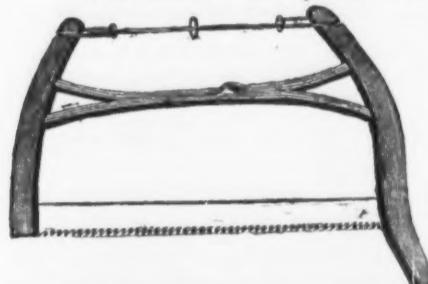
The following interesting statistics show the movements of metals at French ports during the first quarter of the current year, as compared with the corresponding period of 1872:

Imports.	Exports.
France.....	2,843,000</td

HENRY DISSTON & SONS'
SAW, TOOL,
STEEL AND FILE WORKS,
Front and Laurel Streets,
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Hankins' Elliptic Forked Saw Frame.

Patented June 28th, 1870.



The annexed engraving represents HANKINS' ELLIPTIC FORKED SAW FRAME, which commends itself to the trade for its simplicity of construction. The Forked Brace being all in one piece, without any centre bolt, secures for the Frame great strength and durability.

These Frames are put up with my best Webs, marked "No. 40, Harvey W. Peace."

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AMERICAN SAW CO.,
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Solid saws require frequent gumming, thereby subjecting them to risk of springing or breaking. This is especially the case with cross cuts having Patent Teeth. In the perforated saws **all gumming is avoided**, and the teeth are easily kept long and in proper shape, saving time, labor, expense and vexation. As is well known, our saws cut faster, smoother and easier than any other.

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 from Sheet Cast Steel.

E. C. ATKINS & CO.,

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Best Cast Steel Patent Ground Saws.
 Also, sole Manufacturers of Atkins' Patent

CROSS-CUT SAW HANDLE.
 Best Patent Handle in use.
 Manufactory and Office—Nos. 210, 212, 214 and
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I make a specialty of the LARGEST SIZES of Circular Saws, and call particular attention of lumber manufacturers to the following points of excellence:
Evenness of Temper.—The peculiar structure of my furnace subjects all parts of the saw to a DEAD heat, so that when dipped in the oil bath secured perfect uniformity.
Perfect Accuracy in Thickness.—My saws are ground on a patent machine, automatic in its operation, so that on the back when the plate is turned before the timber parts are removed, and when the saw is removed BALANCES PERFECTLY, which is proof positive of the right accomplishment of the work.
Properly Hammered.—Great care is taken that no saw shall leave my works without due attention in this important particular. A saw too tightly strained upon the rim, or too loose in the center, will be unsatisfactory. Hence the importance of so hammering the saw as to effect equal strain in all its parts, and at the same time RUN TRUE. This department is under the personal supervision of myself.
 I am sole proprietor and manufacturer of the celebrated "Challenge" Cross-Cut Saw. Price Lists of all kinds of saws sent on application.

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WORRALL & CO.,
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J. FLINT & CO.

Manufacturers of all kinds of **SAWS** and **PLASTERING TROWELS.**

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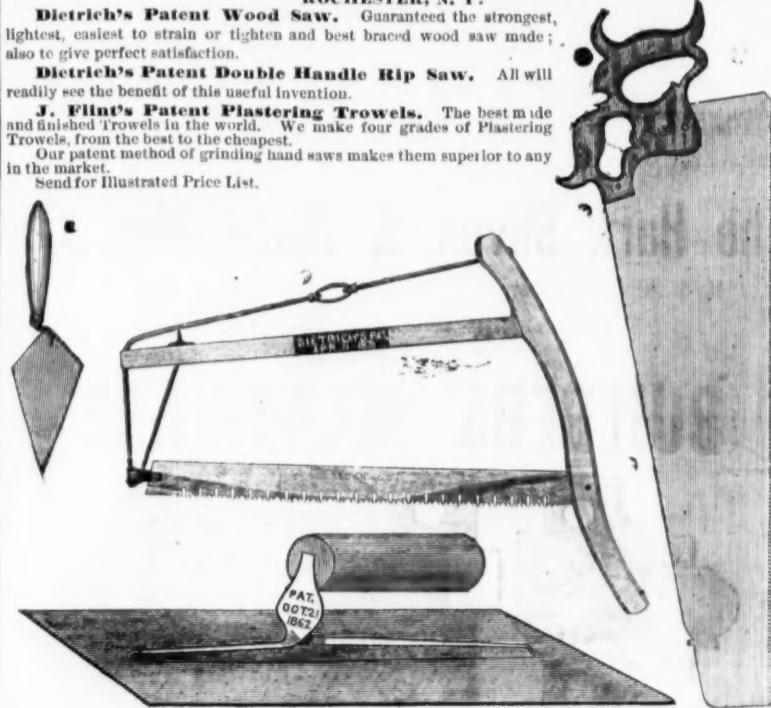
Dietrich's Patent Wood Saw. Guaranteed the strongest, lightest, easiest to strain or tighten and best braced wood saw made; also to give perfect satisfaction.

Dietrich's Patent Double Handle Rip Saw. All will readily see the benefit of this useful invention.

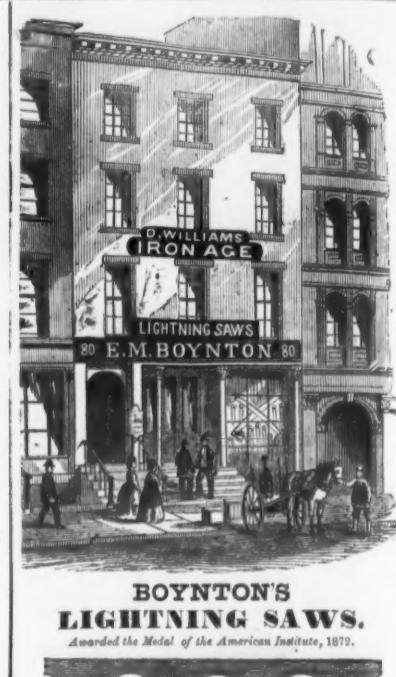
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Our patent method of grinding hand saws makes them superior to any in the market.

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I have hundreds of letters from practical sawyers, voluntarily written, expressing their entire approval of these Saws.

We are the Hardware Trade do not sell the Lightning Saw, I will send a 6-foot cross-cut and a buck saw-blade on receipt of \$1.

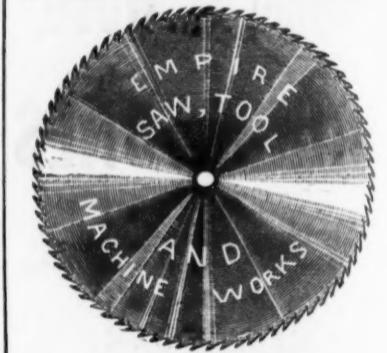
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Saw Grinding Machinery

Of the most approved make, on hand and for sale; warranted to grind either straight or to any given taper or bevel. Sole maker of the

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General Machine Work executed to order.

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Manufacturers of Warranted Cast Steel

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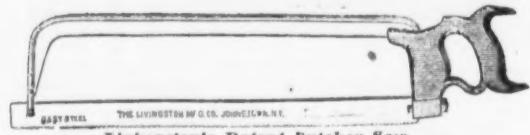
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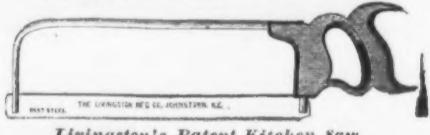
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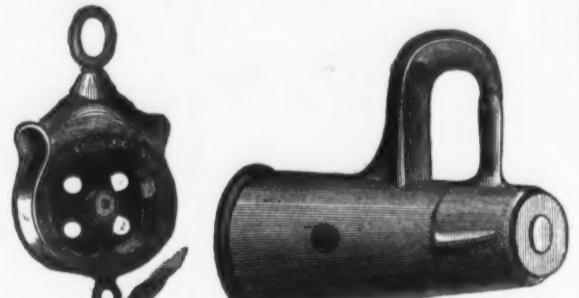
95 Reade and 113 Chambers Street, New York.



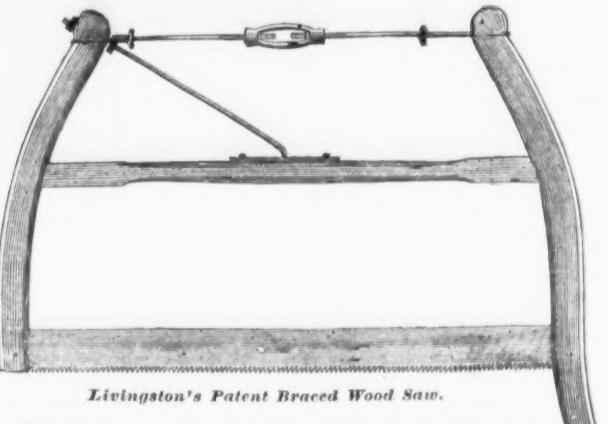
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Livingston's Patent Kitchen Saw.



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**Whifletree Hooks, Hay Fork Pulleys,
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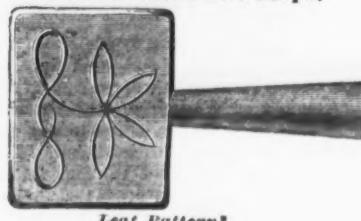
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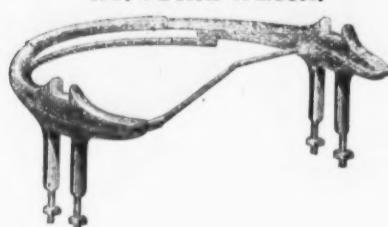
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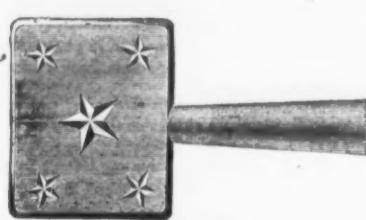
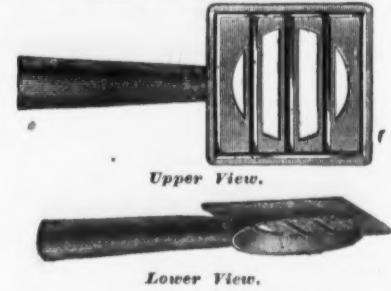
No. 6 Fifth Wheels.



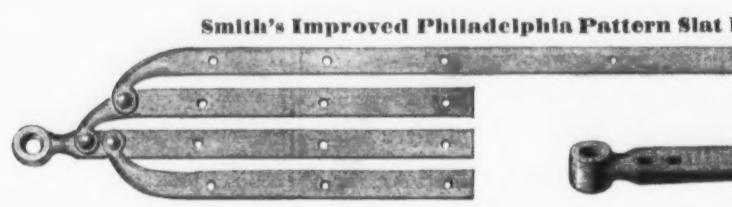
1871 Pattern Shaft Couplings.



Patent Cross Bar Steps.



Star Pattern.



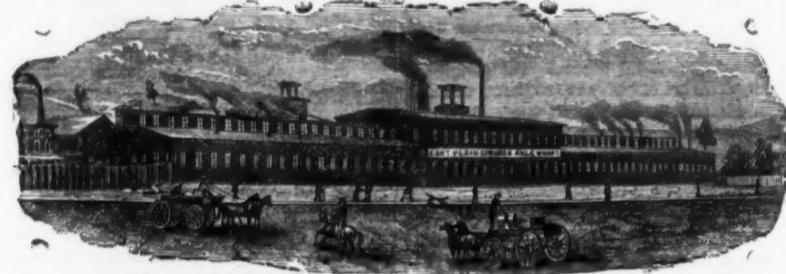
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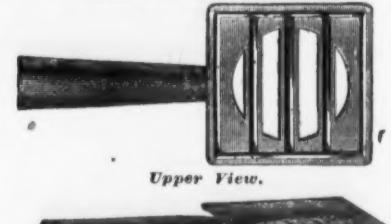
Blank Bolts, &c.

Square Head Bolts,
Wood Screws.

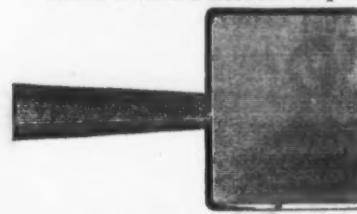
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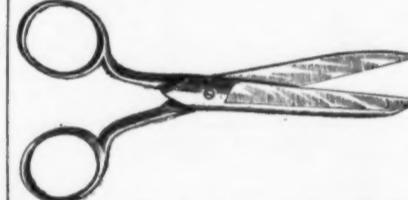


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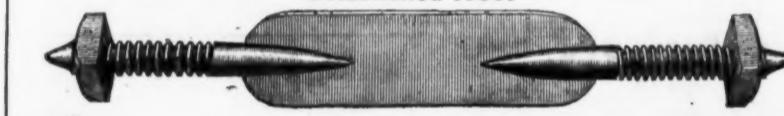
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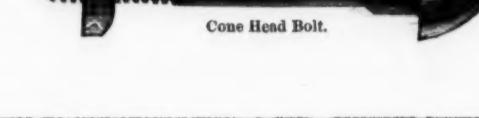
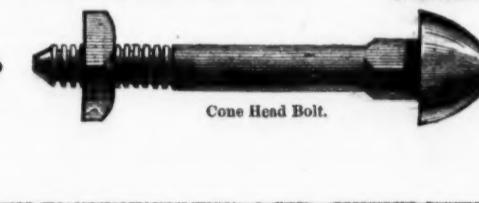
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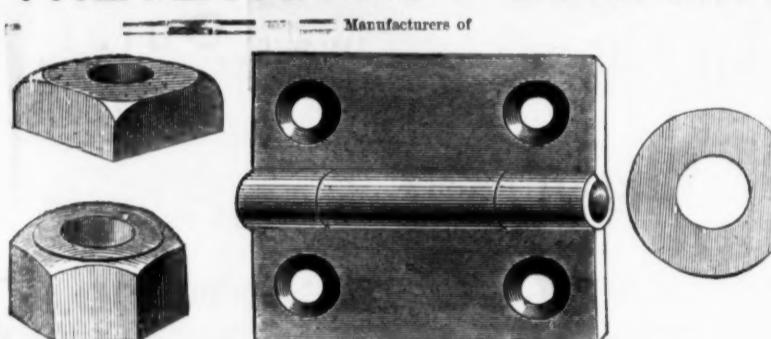
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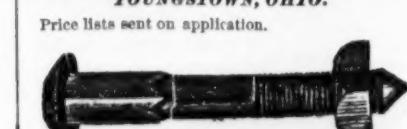
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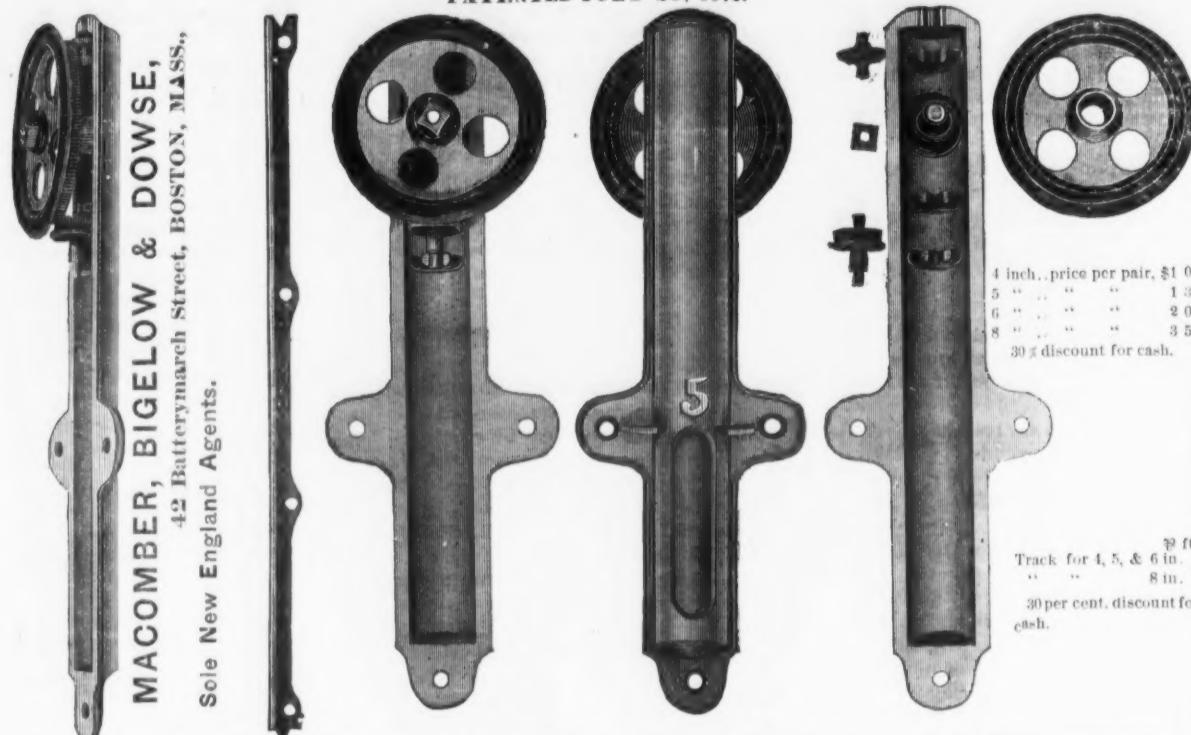
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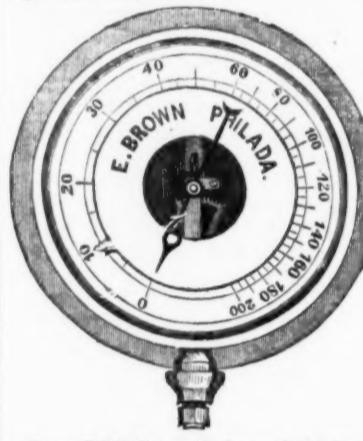
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Chains, cks., 13	Gardine, W. H. Scrap, lots, 1; bbls., 9
Beam & Murray,	Jackson & Chase, Sheet, bbls., 191
Casks, 6	Launderland & Co., Haybands, bbls., 1150
Misc. pkgs., 1	Middleton & Co., Scrap, lots, 1
Cases, 1	Naylor & Co., Bundles, 481
Bryce Wm. & Co.	Oelrichs & Co., Casks, 128
Casks, 3	Prosser Thos. & Son, Tubes, bbls., 30
Cooper, Harris & Hod-	Pace E. & Co., Bars, 3260
kins	Tons, 1077
Casks, 3	Phelps, Dodge & Co., Sheet, bbls., 161
Clark, Wilson & Co.	Slater, Joseph, Bundles, 177
Files, cks., 2	Spark J. H. Sheet, bbls., 25
Degraw, Armar & Co.	Bars, 9 Pigs, 2544
Chains, 7; cks., 2	Axes, 6 Bundles, 20
Fraser P. A. & Co.	Van Wart & McCoy, Bundles, 194
Misc. pkgs., 1	Whitney A. R. Flues, 150
Field A. & Co.	Orders
Cases, 20	Bars, 198 Pig. tons, 1922
Anvils, 29	Scrap, kilos, 51,874; tons, 1380
Chains, 1; cks., 2	Steel.
Hilger E. & Sons, Mdse. pkgs., 2	Abbott & Howard, Cases, 30
Kremer & Co.	Armstrong M. & Co., Bundles, 170
Boxes, 1	Cockayne J. W. Bundles, 161
Lau & Garlachs, Mdse. pkgs., 3	Bars, 77 Cases, 9
Cases, 6	Hogan John, Cases, 47
Lewis & Conger, Casks, 1	Cases, 8
Laundland & Co., Wire, cks., 7; bbls., 61; coils, 4	Jackson Wm., Bundles, 111
Moore F. W. Files, cks., 10	Moss F. W., Cases, 10
Many F. L. & Marshall, Mdse. pkgs., 2	Bales, 342
Peace Chas., Packages, 9	Bars, 14
Peters Bros., Cutlery, cases, 2	Naylor & Co., Axes, 100
Roosevelt S. & Co.	Tires, 36
Cases, 5	Cases, 61
Russell & Erwin Mfg. Co.	Sparks J. H., Bundles, 73
Misc. pkgs., 1	Cases, 2
Sparks J. H., Boxes, 3	Vose, Dinsmore & Co., Bundles, 1
Chains, pcc., 79	Mdse. pkgs., 2
Spies, Kissam & Co., Mdse. pkgs., 3	Order
Schweitzer Mfg. Co., Mdse. pkgs., 2	Bundles, 370
Tillotson L. G. & Co., Galvanized wire, lots, 193	Rails, 2730
Union Hardware Co., Mdse. pkgs., 2	Metals.
Van Nest & McCoy, Cases, 9	Dickerson J. S. & Co., Tin plates, bxs., 1600
Van Nest A. R. & Co.	Hawley Green, Scrap, bbls., 4
Casks, 9	Lamarck H., Zinc, bbls., 120
Western Union Tel. Co., Gal. wire, lots, 1138	Order
Order	Yellow metal, sheets, 815
Packages, 4	Tin plates, bxs., 163
Casks, 3	Copper, Ingots, 439
Iron.	Order
Amsick L. E. & Co., Scraps, tons, 66	Tin plates, bxs., 1768
Brown Bros. & Co., Bars, 1256	Scrap, copper, hdds., 3; cases, 3
Bussing, Crocker & Co., Pig. tons, 38	Phelps, Dodge & Co., Tin plates, bxs., 7818
Congreve Chas. & Son, Fish plates, bbls., 570	Rivett & Co., Scrap, copper, hdds., 8
Rails, 1011	Sparks J. H., Yellow metal, sheets, 815
Darrell & Co., Barrels, 22	Tin plates, bxs., 163
	Copper, Ingots, 439
	Order
	Tin plates, bxs., 1768
	Tin Ingots, 812

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New York, Thursday, July 24, 1873.

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Sixteenth Page.—Certain Necessary Inventions. Railway Reform—The Block System in England. Blast Furnace Slag. Scientific and Technical Notes.

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Certain Necessary Inventions.

From an ethical stand point, it may be regarded as the duty of every one gifted with an inventive talent to employ it in whatever direction will lead to results which promise most benefit to society. Upon capitalists, manufacturers and managers of industrial enterprises devolves, in turn, the duty of testing and adapting to useful employment inventions and improvements brought to their notice, not only to insure the ends immediately proposed, but to encourage further effort in those directions whence safety to life and limb and progress in the arts are mainly found.

A notable illustration of the truth of these remarks may be found in the "accident" which occurred at No. 49 Dey street, in this city, on the 21st of June, whereby several persons were severely wounded, one or two fatally, as reported at the time of this writing. Like numberless other so-called accidents, this calamity might have been averted by the exercise of a little ingenuity, or, in other words, by the production of a simple device to do safely and quickly that which a reckless stupidity chose to do dangerously and slowly by a clumsy method. A large quantity of condemned copper-cased cartridges were being taken to pieces, the shells to be sold as old copper, the powder to be collected in bulk for re-use in other forms, and the lead to be re-melted. These cartridges, as is well known, have their fulminating powder, to be exploded by percussion, enclosed in the base, and the danger of subjecting them to concussion is manifest. Yet, in spite of this, the mode adopted for separating the bullets from the shells was to screw the cartridges in a vise, and with a chisel dig out the lead. The account before us does not state specifically that a hammer was used, but whoever is familiar with the difficulty of cutting metal without this appliance, will

scarcely doubt that it must have been employed. At all events, a cartridge exploded under the hands of the operator, several others followed in quick succession, the loose powder lying about ignited, and the whole place was soon a scene of fire, confusion, and deadly casualty. Now, we venture to say that there is not one in ten among the readers of this article who could not in two hours provide a device for removing bullets from their copper shells without the slightest liability of setting off the priming, and at a rate twenty-fold faster than that so clumsily and so unfortunately adopted. In point of safety it would have been essential to avoid jar, and a firm pressure on the parts would have been preferred to a sudden or jarring application of force. To insure quick work the trouble of clasping in an ordinary vise would have to be avoided. It is quite easy to conceive that all conditions might have been met by a simple clamp grasping the body of the shell an eighth of an inch from the rim, and another gripping the projectile itself, so that a gradual though speedy movement apart would separate the two. We do not say that there might not be a dozen better ways of accomplishing the same result, but something of this kind would undoubtedly have prevented the catastrophe.

But this is only one of a class of casualties that are continually occurring. A year or two ago, and not a hundred rods from the scene of the accident just mentioned, another explosion occurred. It was of fireworks carelessly handled, and in the brief attention it excited, brought out the fact that many persons employed in fireworks manufacture lose their eyesight by comparatively slight explosions of the material with which they work. That safety might in many instances be secured by a strong, iron bound plate of glass interposed between the face and the hands of the workman, is evident at a glance. In lieu of this, thick spectacles would answer a good purpose, aside from the possible detriment to eyes never accustomed to them and not ordinarily needing them. People are notoriously careless with gunpowder; witness the smokers who, three or four years ago, in Park Row and Chatham street, fired the wagon load of rockets and Roman candles on which they were riding, and blew three or four of their recklessness number out of the world. Hence, any improvement, great or small, from the safe storage of tons of gunpowder to the prevention of conflagration from fire-crackers, which will nullify carelessness and put it out of the power of people to do mischief to themselves or others, would be a public benefaction, and yet no one thinks it worth his while to employ inventive talent in these directions, doubtless because of lack of encouragement. Some years ago a blind man, an English inventor, Mr. Gale, projected a method of storing gunpowder without liability of explosion, by mingling it with ground glass. The minute particles of glass so separated the powder grains that the flame crept, as it were, from one to another, and the mass burned slowly instead of exploding. When required for use, the powder was to be separated by a riddle or screen. But this plan was troublesome, and much greater space was required for storage, and it amounted to little or nothing. Gunpowder kept in subterranean magazines, under guard, is safe enough, but if it were made impossible of explosion until needed, by some cheap, simple and convenient means, the originator would earn the gratitude of humanity. And now a word as to fire-crackers. It is a little discreditable to our inventors that 4th of July should be celebrated by Young America with paper guns brought from the antipodes. If machine-made fire-crackers were manufactured here, no doubt some one would soon hit upon the idea of fire-proofing the paper, and then it would be impossible for the juveniles to burn up half a city in four hours, as they did in Portland, Me., half a decennium ago.

There is scarcely a branch of manufacture or department of industry in which there does not lurk a source of danger, laying the duty of prevention on inventors and users alike. It is not long ago that cases of explosion with dentists' vulcanizing vessels were far from uncommon; and in England kitchen boilers have afforded numerous similar examples for lack of some safety appliance. Some simple device for testing kerosene, capable of safe and easy manipulation by an unskilled person, would go a great way in preventing loss of life from too volatile illuminating oils, and the adoption of improved hatches for hoistways would prevent such accidents as, the other day, in an up-town ware-house, hurled a poor fellow down the depth of three stories to the basement floor, because of a careless step. These may seem like minor matters, but they concern human life and limb, and that is enough to demonstrate their importance. And if those be not sufficient, our mines, railways and steamships furnish opportunities of greater magnitude for humanitarian work in the same direction.

Railway Reform—The Block System in England.

The select committee of Parliament lately appointed to report upon measures now under consideration for the prevention of railway accidents, have recommended that action be postponed until more opportunity can be had for the investigation of the subject, and a bill prepared which will tend to insure protection to railway travelers by the easiest and most effective means. The principal bill relating to this subject now before Parliament, and to which the committee chiefly refer in their recommendation that action be postponed, is one providing that two systems, known respectively as the "block" and the "interlocking" systems, shall, within five years from the passage of the act, be adopted on all the railroads in Great Britain.

As most of our readers probably know, the block system consists in certain arrangements for dispatching and running trains by which the various sections of the track are "blocked," or closed, until the trains passing over them shall have left the line clear. The object sought is to prevent the possibility of collisions, and it may be said to accomplish this object in all but the most exceptional cases. The interlocking system consists in such a combination of the machinery by which the points and signals employed in the block system are worked, as precludes the possibility of any difference between them, and guarantees that the intelligence conveyed by the signals shall correspond with the disposition of the points. Together they constitute a system nearly perfect as possible, and the committee admit that their adoption would tend to promote the safety of life and limb on railways. The objections commonly urged against them are rejected by the committee as trivial and unfounded. It has been held, for example, that if so many signals were required before a train could pass the various stations on its line, a much lower average speed would be necessary, and passengers would lose time. The committee report, however, that on well-managed railroads the block system has not been found to interfere with the running of trains at high speed, and that it insures a degree of safety not attainable when a certain fixed distance is not preserved between trains running in the same direction. It has also been held, by those interested in defeating the bill, that the multiplication of mechanical arrangements and precautionary appliances had the effect of diminishing the sense of responsibility now felt by engineers, but this consideration the committee dismissed as unimportant. They say that on many single lines these systems have been found indispensable to safety in the running of trains, and they accord them unqualified approval. The recommendation that compulsory legislation be postponed is based upon good and judicious reasons. The committee say that the railroad companies are now doing much to promote the safety of travel, and have inducements to do more, and that so long as this disposition is manifested, it is best to leave the adoption of improvements involving large outlays of capital to those who are immediately responsible for the management of the lines. It must be remembered that in England "responsibility" means something very different in this sense from what it means in the United States. During the past two years the British companies have paid damages to the amount of nearly two and a half millions of pounds sterling, and they have, therefore, a direct pecuniary interest in rendering their lines as safe as possible.

It would afford us much satisfaction to note evidences of a similar disposition on the part of railroad managers in this country. In some few instances our railroad companies are doing all in their power to make travel both safe and comfortable, and accidents upon lines thus managed are few in number and generally of slight importance. But notwithstanding the too general neglect of precautionary measures, it may be doubted if the evil is one for which our State legislatures can safely prescribe specific remedies. The chief difficulty lies in the fact that different States would require the adoption of different systems, and that no harmony of action could reasonably be expected, even between adjoining States traversed by lines over which both exercise partial jurisdiction. How it may be in the future we cannot say, but for the present, at least, the only practicable method of promoting the safety of life and limb on railroads is for the several States to fix upon the companies a measure of legal responsibility which they have hitherto escaped. The spectacle of a great and powerful railroad company fighting a suit for damages from court to court until the plaintiff, unable to sustain the tedious and costly litigation, accepts a compromise of his claim and retires impoverished and, by reason of his injuries, unfit for either the duties or the pleasures of life, is not an edifying one to contemplate. The railroad companies in this country have had altogether too much

opportunity to make law suite a terror to their victims, and the measure of their responsibility needs to be more clearly and specifically defined. When this is done, and each accident from preventable causes resulting in death or injury shall cost them heavy damages, we shall see many and important reforms in railway management. The "direct pecuniary interest" of the companies in the safety of passengers, which obviates the present necessity for compulsory legislation in England, is what we need in this country, and each State can perform its duty in this respect without reference to the laws of its neighbors.

Blast Furnace Slag.

Notwithstanding all that has been said and written on the subject of the utilization of blast furnace slag, the question of how to turn it to practical account by economical methods remains, as yet, unanswered. At the last meeting of the Iron and Steel Institute, Mr. I. Lowthian Bell remarked, in the course of debate, that he, for one, would be very glad to learn how he could utilize practically the slag product of the furnaces in which he is interested, and from this remark it may be concluded that the problem has not yet been solved in England. The brittle nature of slag constitutes the chief difficulty in the way of making it generally useful, and better materials can be had for the purposes for which it is proposed to employ it at a cost but little, if any, greater than that of preparing slag, or of combining it with any other substances calculated to give it cohesiveness and strength. It is probable, however, that we have as yet only determined in part what cannot be done with slag. What can be done remains yet to be discovered. In the enormous and ever increasing slag product of our furnaces we have a material capable, while in a molten state, of being molded into any desired form, and which, when solid, would resist any degree of heat below that which in the furnace was needed to fuse it—a heat, it may be remarked, far greater than any to which it could well be subjected under any other conditions; and it is not too much to hope that scientific research will determine the question of what uses it is adapted to before many years.

Among the recent experiments in the adaptation of slag to useful purposes, those of Mr. Charles Wood, of the Tees Iron Works, command most attention at the present time. Mr. Wood's machine for granulating slag, which we illustrated and fully described in our issue of May 1st, seems simple in construction and effective in its operations. The slag is disintegrated by being run from the furnace upon a slowly revolving disc, and is further cooled by water, after which it is brought in contact with a set of automatic scrapers, which break it up and deposit it in vehicles adapted to its transportation to the place where it is to be used for road making and other purposes. Another machine, by the same inventor, converts the slag into a coarse sand, which, when combined with 10 per cent. of quicklime, makes a very good cement, and, when pressed, a good quality of brick. Mr. Wood has made several hundred tons of these materials, all of which have been employed in the manufacture of concrete in important works. To what extent Mr. Wood's systems are susceptible of practical adaptation to the economical treatment of slag in large quantities we do not know, but we believe it has not yet come into very extensive use in England, and that it is still experimental.

It would afford us much satisfaction to note evidences of a similar disposition on the part of railroad managers in this country. In some few instances our railroad companies are doing all in their power to make travel both safe and comfortable, and accidents upon lines thus managed are few in number and generally of slight importance. But notwithstanding the too general neglect of precautionary measures, it may be doubted if the evil is one for which our State legislatures can safely prescribe specific remedies. The chief difficulty lies in the fact that different States would require the adoption of different systems, and that no harmony of action could reasonably be expected, even between adjoining States traversed by lines over which both exercise partial jurisdiction. How it may be in the future we cannot say, but for the present, at least, the only practicable method of promoting the safety of life and limb on railroads is for the several States to fix upon the companies a measure of legal responsibility which they have hitherto escaped. The spectacle of a great and powerful railroad company fighting a suit for damages from court to court until the plaintiff, unable to sustain the tedious and costly litigation, accepts a compromise of his claim and retires impoverished and, by reason of his injuries, unfit for either the duties or the pleasures of life, is not an edifying one to contemplate. The railroad companies in this country have had altogether too much

opportunity to make law suite a terror to their victims, and the measure of their responsibility needs to be more clearly and specifically defined. When this is done, and each accident from preventable causes resulting in death or injury shall cost them heavy damages, we shall see many and important reforms in railway management. The "direct pecuniary interest" of the companies in the safety of passengers, which obviates the present necessity for compulsory legislation in England, is what we need in this country, and each State can perform its duty in this respect without reference to the laws of its neighbors.

Scientific and Technical Notes.

Newspaper correspondents see very wonderful things, sometimes. For example, a correspondent of the Chicago Tribune, who has made the acquaintance of a new

OXY-HYDROGEN ENGINE, says of it: "I have been shown the elements and drawings of an engine to be propelled by the combination of oxygen and hydrogen in the presence of flame, producing expansion, and, of course, explosion, if not under control. This power can be generated at a trifling expense—not to exceed one-fourth that of steam. And, by saving the weight of fuel, and much of the weight of machinery, with greatly increased activity of machinery, the result is a great gain. The momentum acquirable in this way is believed to be such that ships may cross the Atlantic in three days, or even in less time. The paddle appliance is also a novelty—simple, but efficient. This power is applicable equally with steam or water to any kind of machinery."

The firm of Messrs. Dunlop & Meredith, of the Cliff House Iron Works, West Hartlepool, have just completed

THE HEAVIEST GUN METAL CASTING EVER MADE. viz.: the stern frame for a Brazilian armor-clad man-of-war of 5400 tons register, now in course of building at the shipyard of Messrs. J. & W. Dudgeon, of Cubitt Town, London. The dimensions of this monster work are 26½ feet by 21 feet in length, and 9 feet 10 inches between the frames. The "boss" through which the shaft of the propeller is to pass measures 2 feet 9 inches in internal, and 3 feet 9 inches external diameter, and the estimated weight of the whole is upwards of 25 tons. The outer post is 22 by 10 inches in thickness, and the inner one, which is "stepped" to receive the armor plates, is from 7½ inches down to 1½ inches thick. In addition to this highly successful work, the above firm have been entrusted with the order to cast the stem and rudder frame, equally massive works, of the same material.

Mr. F. W. Hartley's paper on **COAL GAS AS A FUEL** contains many interesting and useful suggestions. The employment, he said, of coal gas, and of other inflammable gases, in place of solid fuel had been advocated, but, so far as his knowledge extended, no attempt had hitherto been made to show by reference to known facts, and by calculations based thereon, the relative commercial value of coal gas and of solid fuel for heating purposes. Dealing with coal first, its value for heating purposes was usually expressed by a statement of the number of pounds of water which one pound of coal was capable of converting into steam from the boiling point, or of raising 1° Fahr. in temperature. The heating power of coal differed very widely, and there was, beside a very wide difference between the theoretic value, calculated from composition, and the actually attainable heating value of coal. Having given a few examples of this difference, the writer stated that in some of the large water works, and with engines worked on the expansive system, less than 3 lbs. of coal sufficed per horse-power per hour, and it was claimed for some engines of 50 horse-power to 100 horse-power that about 2 lbs. of coal, or less, suffice per horse-power per hour; but in smaller stationary engines there could be no doubt that the consumption ranged from 7 lbs. to as high as 14 lbs., or 15 lbs. of coal per hour; and as gas was really available only for small engines, these weights must be taken as the bases for comparison. Mr. Goddard stated that with the Jackson boiler 100 cubic feet of gas were required per hour, and it followed that the cost per hour would be for gas 4-8d. as against 0-9d. for 7 lbs. of coal, or as against a fraction over 2d. for 15 lbs. of coal; so that, on the face of these figures, gas was manifestly a very expensive fuel, and it was quite evident that wherever engines were required for continuous work there could be no question as to which kind of fuel was to be preferred on economic grounds. All published facts and reasonings tended to prove that gas could never on the larger scale compete with solid fuel, whether the application was for heating water to supply steam to engines, or for other purposes; for even if coal gas were manufactured for the purpose at one-third the price he had assumed, so large a margin would be left in favor of solid fuel as to put gas out of competition. Very similar relations held in respect to the two kinds of fuel when used for cooking on a large scale, but in the case of what might be called dry cooking—baking or roasting—gas was by far the most advantageous, because it could be put into full operation the moment it was wanted, and its combustion stopped the instant that the necessity for its employment ceased. Mr. Hartley then proceeded to institute a comparison between gaseous and solid fuel in their application to the warming of rooms, the conclusion he came to being that coal was more advantageous when all things were taken into account.

Mr. Nehemiah Gibson, of Boston, proposes **A NOVEL TRANSPORTATION SCHEME**, by which he hopes to shorten and cheapen water transportation between the coal producing districts and the port of Boston. His plan provides for the construction of iron barges to carry coal from New York, Philadelphia, or Baltimore, by way of Narragansett Bay and the Taunton River, in Massachusetts. The vessels are to be very strong, each to hold four hundred tons of coal, and to be propelled by tug boats. From some point on the Taunton River he thinks that a railway can be constructed upon which these barges can be taken from the water and carried overland about twenty miles to the cars at Weymouth. In this way one hundred and fifty miles of sea transportation will be saved without breaking bulk. The construction of the road and the barges, however, will be very expensive. The rails will, of course, have to be very large, made of steel, and laid on a road-bed much wider than the ordinary railway.

British Railway Brakes.

BY JAMES A. WHITNEY, M. E.

II.

The present articles are designed, not to sketch the salient features of all English brakes, which is manifestly impossible, or to present even examples of each class, which would be difficult within the space to which these writings must be limited, but simply to notice those systems of mechanism or methods of construction which may warn against useless effort by their failure, or lead to further improvement by characteristics of at least apparent merit. In the matter of the mere transmission of power from the prime mover to the brake-bars much ingenuity, displayed in complex arrangement of levers, rods, screws, spur-wheels and toggle-joints, has been wasted, and the means proposed for substituting these by simpler, if not more efficient, devices possess somewhat of interest and possible utility.

And first on the list may be mentioned with some fullness the earliest "steam brake," the ante-type of the atmospheric brake, inasmuch as in the latter as in the former an elastic aero-form body provided the actuating power. This was patented by Robert Stephenson, Oct. 7th, 1833. It comprised a "brake or clog" caused to press on the tires of the locomotive "by means of a piston working in a small cylinder supplied with steam from the boiler."

In 1835 William Carmall produced an apparatus which seems to have depended upon the absorption of power from the momentum of the train by causing it to be diverted and consumed in driving a quantity of liquid through a small orifice. The novelty is set forth as consisting "in a mode of stopping railway trains or carriages by the employment of a piston which is made to work backward and forward through the medium of an eccentric, and to drive to and fro a quantity of oil through a small passage uniting the two ends of the cylinder. The passage is furnished with a stop or valve of such size that when fully open it affords little or no resistance to the passage of the oil, but when partially closed offers such resistance thereto as to cause the piston to act as a brake, and to either retard or stop the motion of the train." It is difficult to see how the friction of oil in its passage through an orifice, however small, could be made effective for the function mentioned, and, if there be any utility in the project at all, some liquid possessed of greater asperity would answer a better purpose.

In 1841 Walter Hancock suggested a brake activated by water from the boiler, the water being conducted to cylinders, the pistons of which acted directly upon the brakes. Of course the pressure would be proportioned to that of the steam in the boiler, and the only advantage apparent over the admission of steam direct to the brake actuating cylinders, lies in the avoidance of the condensation which would occur with the latter. But, manifestly, this would be offset by the loss of all the heat in the water ejected from the boiler, for there seems to be no method shown of returning the water to the boiler when the brakes were released; and even if this were done, the additional complexity would nullify any advantage derived from it.

In 1842 J. H. Pope proposed the use of "screws for forcing brasses against the axle," in lieu of the usual application of brakes, a plan on the face of it too ridiculous for serious consideration.

The use of a liquid for transmitting power is of remote origin, but within the past three decades has received manifold applications, ranging from the operation of cow milking machinery to the working of power drills. Its earliest projected use for railway brakes appears to have been that of Frederick Lipscomb, in 1843, and the abridgement of the British patent condenses the description into such small compass that it is here quoted entire:

"The brakes, which are of the ordinary character, are brought into action by turning a screw, which forces down a plunger in a certain cylinder, from which a pipe proceeds to a second and smaller cylinder containing a piston, there being between the plunger and the piston a quantity of oil, water or other liquid, by which the movement of the plunger is communicated to the piston. At the end of the piston rod is a rack, in gear with a pinion fixed upon a shaft passing across the carriage (car), and having upon it other pinions by which, through the medium of other racks and cars, the brakes are pressed against the wheels. The screw is turned in applying the brakes, by means of a strap coiled round a drum, which is fixed on the upper part of the screw, but is turned in releasing the brakes by a winch, the plunger being furnished with a helical spring, which prevents the brakes from leaving the wheels when in action, should the winch be at liberty." The use of a liquid for transmitting power under the complex and rough conditions of railway practice is obviously inferior to that of atmospheric air for the same purpose, but in the present emulation to secure novelty as well as utility in this class of mechanism, it is quite likely that recourse will, to some extent, again be had to this hydrostatic method of giving motion to the brake blocks. Apropos of these last, in 1844, one John Melville projected a brake to be placed on the tender, and comprising wooden blocks encased in iron shells, and forced down upon the wheels by vertical screws, the frictional surface of the blocks being kept constantly wet by a flow of water, in order to increase their retarding hold upon the wheels.

The earliest specified use of atmospheric air in the English records, is the communication from Eugene Viscount de Beuret, presumably a French projector, and whose invention differs more widely from the present atmospheric brake than does the steam brake of Stephenson. For de Beuret placed between the ordinary rails of the track, which he designated as a rubber, a long rail fitted to be clasped between the long jaws of a kind of clamp carried by the car, and forced toward each other to grasp the rubber (and by friction thereon retard the train) by springs formed either of metal or by the compression of air in cylinders.

The earliest pneumatic brake, acting on a principle analogous to the essential element of the atmospheric apparatus now favorably in vogue, is that patented by Dalrymple Crawford, in 1845. In this a separate car carried a cylinder and piston, the former provided with a valve at one end to permit the pressure of the atmosphere against the latter when required. To the piston rod was attached a strong cord or chain, the opposite end of which was attached to a drum turned by a crank. By rotating the drum the piston was moved to expel the air, and the valve was then turned to exclude the air pressure upon the piston. This latter, by appropriate devices, was connected with the brakes, so that on turning the valve to admit the air, the piston was forced inward to actuate the brakes. In this class of apparatus, as in pneumatic railways, the substitution of compressed air pressure, as in the Westinghouse brake, for the vacuum used to induce atmospheric pressure, is a simple reversal of the operation, and that, moreover, any other fluid may be used in lieu of compressed air to transmit the power. The practicable power brakes may, therefore, be considered under the heads

of atmospheric, steam and hydrostatic brakes. Each of these is of sufficient importance to merit an article by itself, inasmuch as the English records before referred to, show, anterior to 1866, their latest date, no less than 32 pneumatic, 51 steam, and 20 hydrostatic brakes.

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Giving in tabular form, the net prices of Iron Wire, in

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Twenty-One Different Discounts
From List Price, viz:
$$\begin{array}{ll} \frac{1}{2} & \frac{1}{4} \\ -10 & -15 \\ -15 & -20 \\ -20 & -25 \\ -25 & -30 \\ -30 & -33 \frac{1}{2} \\ -33 \frac{1}{2} & -37 \frac{1}{2} \\ -37 \frac{1}{2} & -42 \frac{1}{2} \\ -42 \frac{1}{2} & -47 \frac{1}{2} \\ -47 \frac{1}{2} & -50 \end{array}$$

COMPRISING, ALSO,

A Supplementary Table,

From which may readily be ascertained the Value of any number of pounds of Wire, from one to ten thousand, of any size from 0 to 20, at all the above discounts.

Recommended by Washburn & Moen Mfg. Co., of Worcester, Mass.; Eggleton Mfg. Co., of New York; Trenton Iron Co., Trenton, N. J.; Cooper, Hewitt & Co., New York; and Stewart & Co., of South Easton, Pa.

Printed in large clear type, on first-class paper, and substantially bound in cloth. **Price, 2 dollars.**Mailed to any address, postage paid, by the compiler and publisher,
E. HANSON,
Trenton, N. J.

This work is Copyright.

Wanted,By a young man twenty years of age, who has had four years' experience as entry and shipping clerk in a hardware house, and is perfectly acquainted with all their goods (old and other hardware), a situation as salesman or shipping or entry clerk for a first-class hardware manufacturer or jobbing house. Best of reference as to character, ability, &c., &c. Address **(U. C. R.)**

Lock Box 15, Reading, Pa.

To Hardware Manufacturers.

A house dealing in General Hardware, Tools and Cutlery is desirous of securing the agencies of leading goods of large sale. To parties who want a depot in Chicago, and a house to represent them, this is a good opportunity. Satisfactory reference.

Address **W. T. HAMMOND,**
77 W. Madison Street, Chicago.

THE

CANADIAN BANK OF COMMERCE.

Capital - - \$6,000,000, Gold.

Surplus - - \$1,500,000, Gold.

The New York Agency, No. 50 Wall Street, buys and sells Sterling Exchange, makes Cable Transfers, grants Commercial Credits, and transacts other Banking Business.

J. G. HARPER, Agents.
J. H. GOADBY,**Translations and Condensations.**The undersigned, commercial Editor of *El Cronista* and the Spanish Government paper in this city, and Foreign Editor and Translator of the *Daily Bulletin*, has made it a specialty for years past to translate industrial matter, with the greatest attention to the technical wording, into English, German, Spanish, French, for manufacturers, patentees and others, and begs to be recommended to the iron masters and trade in that capacity.

C. KIRCHHOFF, Box 2806, Post Office. Latest Publications translated by C. KIRCHHOFF, "German Imperial Consular Instructions," "Cuba may become Independent." Officially endorsed by the government of Germany and Spain.

The best medium for advertising American Machinery to the attention of European capitalists. Send for specimen copy, free.

Special Notices.**To Furnace Men and Malleable Iron Manufacturers.**

For Sale or to Let.—The McHaffie Steel Co.'s Works at Lamokin, on the P. W. & B. Railroad, at its junction with the Baltimore Central, comprising Foundry, Annealing Furnaces, Machine, Blacksmith and Casting Shop, etc., etc. The Works are more eligibly located, and with ample facilities for doing a large business. Parties desiring such property are requested to apply in person at the Works, or by letter addressed to "The McHaffie Steel Co., Chester, Delaware Co., Pa."

DAYTON & LAMBSON'S

(Copyrighted)

Revised Discount Bolt List.

Book form, Philadelphia and Common, 20 discounts.

Revised Discount Screw List.

On card, 18 discounts.

Mailed, in perfect order, on receipt of price.

Single copy, either list, \$1.00; two or more, either list, 75 cents each. Address **FRANK DAYTON,**
83 Duane St., N. Y.**Warfords, Robinson & Co.,****LINE OF 37 BARGES**

FOR TRANSPORTATION OF

Lumber, Coal, Iron,

and all heavy freight, between

Troy, New York, Providence,

and all intermediate places.

180 Broadway, WEST TROY,

28 Lumber District, ALBANY,

19 Cents Slip, N. Y. CITY.**FREELAND TOOL WORKS,**

late A. M. Freelander, 556 & 560 West 5th Street, N. Y.

The undersigned, having succeeded to the business of the late A. M. Freelander, and having been in his employ for many years, are now prepared to receive orders for First-class Engineers' & Machinists' Tools; Guide and Standard Screws, cut to order; Surface Plates and Straight Edges of superior quality, on hand and made to order. **THOMAS & CO.****R. T. HAZELL, AUCTIONER.****By R. T. Hazell & Co.,**

Store No. 118 Chambers Street.

One REGULAR SALLES of HARDWARE, CUTLERY, FANCY GOODS, &c., will be held on TUESDAYS and FRIDAYS throughout the season.

CASH ADVANCES made on CONSIGNMENTS without additional charge.

"ENGINEERING,"

A Weekly Illustrated Journal, edited by W. H. MAW and JAMES DREDGE.

OFFICES, 187 Bedford St., Strand, London, W.C., 52 Broadway, New York.

GEO. ED. HARDING, C. E.,

Representative in United States.

This most successful English Engineering Journal, containing thirty-six pages weekly, illustrating the advancement of all Mechanical, Mining and Military Engineering Science, both in Europe and America, can now be obtained by American subscribers, post paid, for \$9.00, currency, per year, sent to the New York office of the publishers.

All the important details of the buildings and novel machinery at the great Vienna Exposition will be illustrated and described in *Engineering* the current year; and this, with illustrations of all the larger American engineering works, will render it invaluable to every American Engineer, Architect, Iron Master and Machinist.

The best medium for advertising American Machinery to the attention of European capitalists. Send for specimen copy, free.

NEW YORK, July 1, 1873.

To Hardware Manufacturers.A house dealing in Foreign Hardware, of nearly 40 years' standing, whose trade is with Hardware Jobbers throughout the United States, is desirous of securing the agencies of American Manufacturers of leading goods of large sale. To parties who want a depot in New York, and a house to represent them with large and desirable connections, this is a good opportunity. Address **HARDWARE,**

Box 3962, New York P. O.

The Journal of the Iron and Steel Institute.

Containing Proceedings of the Institute; Original Communications bearing upon matters connected with the Iron and Steel Trades; Reports on the progress of the Iron and Steel Industries in foreign parts, by the Foreign Secretary (Mr. David Forbes, F. R. S.); Notes on the British Iron and Steel Trades; Statistical Information, &c., &c. Can be obtained from the publishers, Messrs. E. & F. N. SPON, Charing Cross, London. Price 5/- each number. Nine numbers have been issued, and all except Number 1 (1871), which is out of print, can be supplied. The next number of the Journal will be published in a short time.

JNO. JONES, General Secretary.

Royal Exchange, Middleborough, May 22, 1873.

To Hardware Manufacturers.

In view of the probable discontinuance of the firm of Brown, Harris & Hopkins, the undersigned (the "purchasing" partner of the house) solicits negotiations from manufacturers of staple Hardware, with a view to representing them in New York city as agent. All correspondence will be deemed strictly confidential.

HENRY HOPKINS,

Of Brown, Harris & Hopkins,

P. O. Box 1360, New York.

For Net Prices of Bolts see**Kingsley's Discounted Bolt List.**

Warranted correct. Neatly printed on a card. 15

Discounts (25 to 70). Price 75 cents each.

Address **KINGSLEY BROS.,**

119 Franklin Street, Buffalo, N. Y.

MANUFACTURERSdesirous of introducing their goods to the British and Continental Markets, are advised to insert advertisements in the newspaper **"IRON,"** published every Saturday, at 99 Cannon Street, London, E. C.

SCALE: First 8 lines, 8/-; every additional line, 10d.

Price, 6d. per Copy, or 30/- per annum, inclusive of postage to the United States.

Very desirable advertising medium to all interested in these trades.

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4 Warren St., N. Y., Publishers.

NOTICE.

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Scale: First 8 lines, 8/-; every additional line, 10d.

Price, 6d. per Copy, or 30/- per annum, inclusive of

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, July 23, 1873.

The chief features of the past week have been a strong market for all classes of securities. The foreign money markets have been easy, the Bank of England rate having been reduced early in the week to 4½ per cent., while money outside of the bank was obtainable at still better rates. In our own market money has been easily obtainable on call at 3 @ 4 per cent., and on long time, say to the end of the year, at 7 per cent. First-class mercantile paper has ranged from 5½ to 7½ per cent., according to dates.

The manipulations of a clique have strengthened gold, and the price has been as high as 110½. Foreign exchange has ruled, for the most part, above the point at which gold could be exported, and accordingly the specie shipment has been heavy.

The following table shows the course of the gold market during the past week:

	Highest.	Lowest.
Thursday	116	115½
Friday	116	115½
Saturday	116½	115½
Monday	116½	116
Tuesday	116½	116
Wednesday	116½	115½

The most active stocks have been Western Union Telegraph, Lake Shore, Union Pacific, Northwestern, Ohio, Erie, and C. C. & I. C. In Erie a sharp corner was developed on Saturday, and has since continued. The price has been up as high as 65½, but the arrival of some stock by steamer put the price back a shade at the close. Express and miscellaneous shares have been dull.

The bond market has been strong and fairly active. Southern securities have been actively dealt in, and are also strong. Railway mortgages continue to be the favorites for investors.

EXPORTS OF SPECIE.

Total for the week..... \$4,944,534
Previously reported..... 50,997,318

Total since January 1, 1873..... \$35,941,862

IMPORTS..... 1871. 1872. 1873.

Tot. for week... \$6,094,517 \$7,221,303 \$6,590,355

Prev. reported... 305,274,112 237,380,966 256,647,911

Since Jan 1... \$211,368,429 \$244,502,188 \$235,178,268

Included in the imports of general merchandise for the week are:

Quant. Value.
Anvils..... 100 \$1,320
Brass goods..... .96 5,113
Bronzes..... .94 4,080
Chains and anchors..... .96 3,587
Copper..... 3,474
Cotton..... 1,197
Guns..... .217 21,296
Hardware..... 91 5,558
Iron, hoop, tons..... 16 1,619
Iron, pug, tons..... 1,125 41,825
Iron, sheet, tons..... 156 4,727
R. R. bars..... 9,660 156,821
Iron cotton ties..... 644 2,076
Iron tubes..... 1,725 4,889
Iron other, tons..... 4,725 3,887
Lead, plating..... 7,195 43,029
Metal, plating..... 197 27,406
Nails..... 65 1,153
Needles..... 91 6,342
Old metal..... 768 2,254
Platina..... 1 3,362
Por. caps..... 15 1,841
Saddlery..... 9 1,837
Scots..... 4,195 47,000
Spelter..... 225,000 12,511
Silverware..... 4 1,951
Tin, boxes..... 26,664 25,025
Tin, 267 slabs..... 114,391 34,617
Wire..... 650 6,865
Zinc..... 111,034 8,253

The bank statement, owing to the loss of \$2,384,400 species during the week, shows a reduction in the total reserve of \$1,841,800. The total liabilities have increased \$1,179,200, and the banks hold \$2,161,600 less of what is reckoned as lawful money in excess of a 25 per cent. reserve than last week. The banks, it will be noticed, hold \$242,600 more legal tenders than last week. The percentage of reserve to liabilities held by the national banks is 30·87, and by the state banks, which are under no restrictions as to reserve, 26·62, making the average of both classes 30·34 per cent. The following is a comparison of the averages of the past two weeks:

July 12. July 13. Differences.

Loans..... \$28,174,500 \$28,572,100 Inc. \$1,793,600
Specie..... 34,658,000 32,273,600 Dec. 2,384,400
Circulation..... 27,291,800 27,351,500 Dec. 10,300

Deposits..... 238,916,900 240,206,400 Inc. 1,289,500

Leg. Ten. 43,329,900 45,872,500 Inc. 542,600

Government bonds closed strong at the following quotations:

Bid.	Asked.
U. S. Currency 6s..... 114½	114½
U. S. 6s, 1881, reg..... 118½	118½
U. S. 6s, 1881, c..... 130	130½
U. S. 6s, 5-30 reg. May and Nov..... 116½	117
U. S. 6s, 1862, c..... 117	117½
U. S. 5-30 1862, c..... 117½	118
U. S. 5-20 1862, c..... 119½	119½
U. S. 5-20 1863, c..... 117½	118
U. S. 5-20 1867, r. Jan. and July..... 137	137
U. S. 5-20 1865, c..... 115	115
U. S. 5-20 1867, c..... 119	119
U. S. 5-20 1868, c..... 118½	118½
U. S. 10-40 reg. c..... 114½	115½
U. S. 10-40 c..... 115½	115½
U. S. 5s 1881 cou..... 115½	116

The following were the highest and lowest prices of stocks to-day:

Highest.	Lowest.
N. Y. Cen. & Hudson Consolidated..... 104½	103½
Lake Shore..... 96	96½
Rock Island..... 111	110½
Del. Lack and Western..... 100½	100½
Wabash..... 72½	71½
Hariem..... 129	129
Western Union Telegraph..... 91	90½
Northwestern..... 69½	69½
Milwaukee & St. Paul..... 53½	51½
Panama..... 116½	116½
Pacific Mail..... 77½	76½
Erie..... 61½	60½
Ohio & Mississippi..... 40½	39½
Boston, Hartford & Erie..... 8	7½
Union Pacific..... 2½	2½
C. C. & I. C. 33½	32½
Hannibal and St. Joseph..... 40½	39
Consolidation Coal..... 55½	55½
Maryland Coal..... 25½	23
U. S. Express..... 71½	71

Some time since, the Canadian Bank of Commerce, having a capital and surplus of \$7,500,000, established an agency in this city in Exchange Place. Their business has increased so rapidly as to require more room, and the agency has recently removed into the spacious office No. 50 Wall street, in the elegant new white marble building next to the Bank of New York. The agency is under the management of Messrs. J. G. Harper and J. H. Goadby, and their advertisement will be found in our columns.

GENERAL HARDWARE.

There is little improvement in the demand for General Hardware this week over last, although some Western buyers have made their appearance, but as yet we hear of few large orders being placed. The most important feature of the week is the reduction in prices of Cast Butts. The New England Butt Co., under date of 21st instant, issue a circular giving the following prices:

CAST BUTT HINGES.

Wire Narrow and Broad Fast Joint Butts..... 35¢
Common..... 40¢
Narrow and Broad Loose Joint Butts..... 50¢
Parliament Butts and Mayer's Hinges..... 40¢

Parties whose net orders for Butts amount to \$250, or more, for each six months, ending June 30th and December 31st of each year, will be entitled to a discount of 5 per cent. on net.

OTHER HARDWARE.

Sad Irons..... 5½ per lb.
Dumb Bells..... 5c.

Butterworth's Window Springs, No. 1. \$16 per gross.

No. 3. 24.

/ Other miscellaneous goods, 10 per cent. above list prices.

The following are the Union Mfg. Co.'s reduced prices for Cast Butts:

Drilled and Wire Jointed Fast..... 35¢
Drilled and Wire Jointed Loose..... 45¢
And "quantity" discount..... 5¢

Drilled Loose Joint, Plain, Acorn Tip..... 35¢
Drilled Loose Joint, Japn'd. Acorn' Tip..... 35¢
Drilled Loose Joint, Japn'd Silvered Acorn..... 35¢
And "quantity" discount..... 10¢

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And "quantity" discount..... 5¢

THE
ARCTIC
FREEZER.

SIMPLEST.



BEST.

Send for Price List.

E. S. & J. TORREY,

166 Fulton Street, New York,

THE
DIAMOND.

THE LATEST INVENTION.



SELF FEEDING, BASE BURNING

COAL STOVE!

With Solid Iron Fire Pot.

With Illuminated Anti-Clinker Opening.

With Patent Double Grate.

With Center Dump.

With Large Return Flues.

Takes the Lead of the Entire Family of Base Burners.

FOUR SIZES, Nos. 18, 23, 28, and 34.

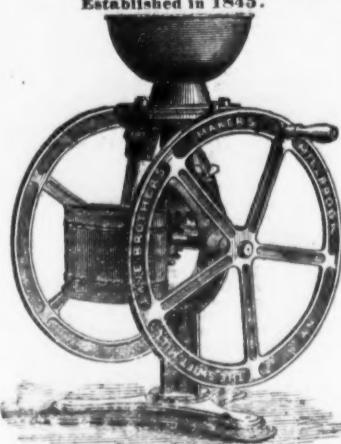
MANUFACTURED BY

JEWETT & ROOT, Buffalo. JEWETT & ROOT, Chicago.
JEWETT & ROOT, Detroit. JEWETT & ROOT, Milwaukee.

Send for Catalogue and Prices.

The Swift Mill.

Established in 1845.

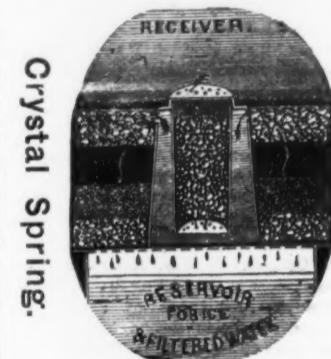


Letter "B" Geared Counter Coffee or Spice Mill.

Stands nearly 3½ feet high. Is highly finished, colors deep Vermilion and Gold. We make more than 20 different styles and sizes.

Send for catalogue. Manufactured exclusively by
LANE BROTHERS,
Millbrook, N. Y.

Water Filter.



Jewett's Patent.

A perfect success, accomplishing results never claimed for any Filter ever invented. This Filter is now the acknowledged Standard all over the United States and Canada.

Send for Circular.

MANUFACTURED ONLY BY
JNO. C. JEWETT & SONS,
BUFFALO, N. Y.ALFRED FIELD & CO.,
Foreign Hardware
Commission Merchants.

PRINCIPAL OFFICES.

Birmingham, England, Nos. 66 & 67 Parade.
Sheffield, England, No. 23 Westfield Terrace.

New York, U. S., Nos. 47 John and 5 Dutch St.

BRANCH OFFICES.

Philadelphia, Cincinnati, New Orleans and
Montreal.

Shipping Office,

Middleton Building, No. 1 Rumford St.,
Liverpool.

VAN WART, SON & CO.

Hardware Commission Merchants,
BIRMINGHAM, - ENGLAND
AGENTS

VAN WART & McCLOY,

45 Chambers Street, New York.

GEORGE H. GRAY & DANFORTH,

48 India Street, Boston.

F. W. TILTON,

17 Old Levee Street, New Orleans.

At each of these places a complete assortment of samples of Hardware and Fancy Goods will be found, including all new descriptions. Sole Agents for the

John Rimmer & Son's Celebrated Harness and other Needles.

OSCAR IRVING VAN WART & CO.
FORWARDING AGENTS,
2 South John Street, LIVERPOOL

SCHOLEFIELD GOODMAN & SON

(Formerly JOSHUA SCHOLEFIELD & SONS.)

GENERAL

Hardware Merchants,

BIRMINGHAM, - ENGLAND.

Agents and Sample Rooms.

New York—Edward Firth, 16 Cliff Street.

Boston—H. L. Richards, 18 Batterymarch Street.

New Orleans—R. Rhodes, 71 Camp Street.

Montreal—J. J. Evans 14 St., John Street.

Four Sizes. Coal or Wood
Shaking and Dumping Grate,
and Swing Top.

SWISS

BELL,

SWISS METAL.

Very Pretty.

half the size of an ordinary Hand Bell can be heard further, and the ear.

the full size of the made either Polished or Nickel Plated.

Price List.



Manufacturers.

SMITH, BURNS & CO.,

Manufacturers of

Galvanized and Japanned Sheet Iron Goods and Tin Ware.

Coal Hods. Patent Stamped Corrugated Riveted Bottom.
Fry Pans. "Excelsior" Polished.
Excelsior Broiler. Best and Cheapest in the market.
Combined Chamber and Commode Pail.
Ash Cans, Galvanized and Japanned.
Galvanized Water Pails, Well Buckets,
Chamber Pails, Tea Kettles, &c., &c.
Toilet Sets. Fancy and Grained.
Chamber Pails, Step Pails, Foot Tubs, Baths, Washers, Carriers, Coolers, &c., &c.
Stamped and Piece Dish Pans and Plain Tin Ware.

Send for Illustrated Catalogue.

Warehouse, 45 Cliff Street, between Beckman and Fulton Streets, NEW YORK.

Manufacturers of the renowned Cooking Stoves, FASHION, for wood, and MONITOR, for coal and wood, and the greatest variety of Coal and Wood Heating and Cooking Stoves. A large stock constantly on hand, and all orders filled promptly. (Send for Catalogue and Price Lists.)

J. D. FARRINGTON, Jr.,

38 Murray Street, New York.

MANUFACTURER OF

Japanned, Plain and Stamped Tin Ware,**THE PATENT SELF-RIGHTING CUSPADORE**

Thirty-Six Different Styles.

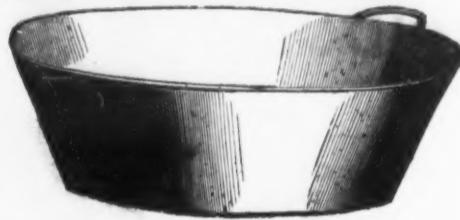
Patented October 10th, 1871.

J. D. FARRINGTON, Jr., SOLE MANUFACTURER.

Price List of Self-Righting Cuspadores:

Class A, Seven Patterns	15 00	per dozen.
" B, Eight "	18 00	"
" C, Eight "	21 00	"
" D, Eleven "	24 00	"
Nickel Plated, No. 1	48 00	"
" No. 2 (small)	42 00	"

Established 1836.

SIDNEY SHEPARD & CO.,

MANUFACTURERS OF

FRENCH WARE, STAMPED AND JAPANNED TIN WARE.

Also, a Large Variety of Useful Articles.

DEALERS IN

Hardware and Metals, Tinmen's Tools, Machines and Trimmings.

Please send for Illustrated Catalogue and Price List.

SIDNEY SHEPARD & CO., Buffalo, N. Y.

AGENTS.—VAN WART & MC COY, 43 Chambers Street, N. Y.; SHEPHERD & LLOYD, 405 Commerce Street, N. Y.

Breast Hold-Back Co.

210 & 212 First Street, TROY, N. Y.

Sole Manufacturers of

COVERT'S PATENT METALLIC BREAST HOLD-BACK.

Made of the best Malleable Iron. The Snap is a new invention, and superior to any yet introduced. The spring is encased in the hollow shank of the snap, preventing dirt from getting to it, and without danger of being broken or disarranged. This article has been in use five years by Farmers, Teamsters, Stage Proprietors and Horse Railroad Superintendents.

It gives good satisfaction. It is cheaper and more durable than anything of the kind in use. For sale by the Hardware Trade.

Send for Circular and Price List.

WEST POINT FOUNDRY,

Established 1817. COLD SPRING, N. Y.

Paulding, Kemble & Company,

Office 30 Broadway, New York; Works at Cold Spring, Putnam Co., N. Y.

Steam Engines, Boilers & Heavy Machinery of all kinds, and Heavy Forgings.

FORD'S PATENT STOVE, for heating Air for Blast Furnaces.

Hornig's Patent Shearing and Punching Machines,

NAPIER'S PAT. DIFFERENTIAL CLUTCH, for starting and reversing Heavy Machinery.

Hepworth's Patent Centrifugal Machines.

Castings from Gun Metal, guaranteed 30,000 pounds per square inch.

The "EMPIRE," a Fan Blowing PORTABLE FORGE,

(Patent Applied for.)

Without BELTS or BELLOWS.

It is more EASILY WORKED, gives a BETTER BLAST,

and is the CHEAPEST Forge made, and

IT HAS NO BACK DRAUGHT.

W. P. KELLOGG & CO., Troy, N. Y.,

Also, CURRY COMBS, BORING MACHINES, and COOLEY'S WHIP RACKS, etc., etc.

Bayliss' Pat. Vertical and Horizontal Hot Blast and Water Tuyeres & Forges.

Can be placed in any forge of brick or iron; will not burn out or choke up; suited for light or heavy work, saving time and fuel, and warranted.

Send for Circulars.

JOHN BAYLISS,
147 East 54th Street, N. Y. City.**The Improved Patent Universal Angular and Ratchet Drilling Machine,**

Adjustable to any angle, and easily carried to any part of the shop for making Repairs.

Over 4000 of these machines are now in use, and the demand is steadily increasing.

Dealers will find them of ready sale and at satisfactory profits.

These machines were formerly sold by Messrs. Holland & Cody, and Duryea & Kelley, but since the Miller's Falls Co. purchased the patent and began to make them exclusively in their own shops, the quality and finish has much improved, and they are now really desirable goods. These Drilling Machines are for sale in most of the larger cities at our regular prices, but where they are not so kept we will supply them on demand.

(No. 1, weight 26 lb., Drill $\frac{1}{8}$ in. hole.....	Price, \$34.00
No. 2, " 52 lb., " 1 "	" 38.00
No. 3, " 100 lb., " 1 $\frac{1}{2}$ "	" 65.00

With usual trade discount.

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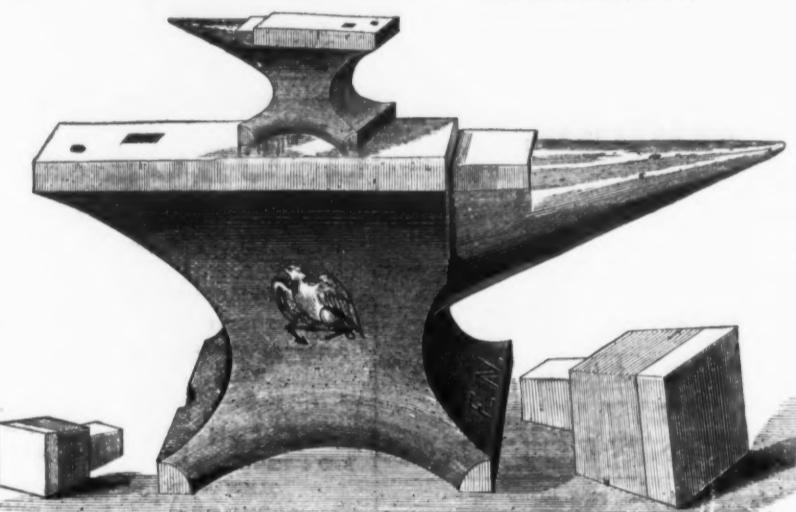
78 Beekman Street, New York.

Factory at Millers Falls, Mass.

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(ESTABLISHED 1843.)



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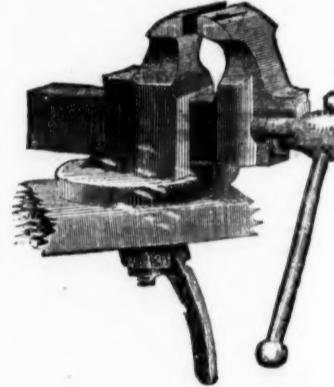
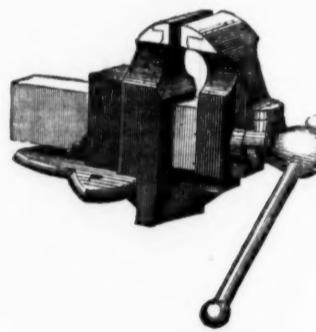
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ANVILS weighing 100 lbs. to 600 lbs., 12 cts. per lb.									
Smaller Anvils, ("Minims.")	No. 0	1	2	3	4	5	6	7	8
Weighing about 10 lb.	15 lb.	20 lb.	30 lb.	40 lb.	50 lb.	60 lb.	70 lb.	80 lb.	90 lb.
Price, \$4.00	\$5.00	\$6.00	\$6.50	\$7.00	\$8.00	\$9.00	\$10.00	\$11.00	\$11.50

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The cut at the right shows the extra set of jaws which we furnish when ordered, at \$2.00.

They can be used for holding small articles for turning, boring, &c., from 0 to 1½.

The jaws can be changed in three minutes.

The best Chuck in the Market!

All its parts are of Cast Steel. Warranted to hold

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Price Extra Jaws \$5.00.

No. 4 VICTOR CHUCK, same principle as No. 3, will hold

drills from ¼ shank down to ½ inch.

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Also, manufacturers of our

UNIVERSAL DRILL CHUCKS, No. 1 and 2,

AND OTHER

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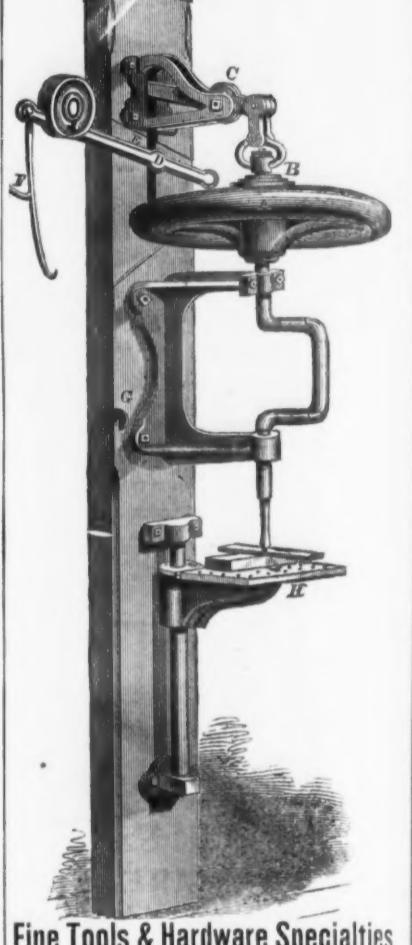
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Illustration of a self-feeding hand drill.



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FINE FLAT-KEYED LOCKS for all Purposes.

RIM and MORTISE STORE DOOR LOCKS,

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(Dealers' Selling Prices.)

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" cotton, No. 1.....	.7 @ 7c
" " No. 2.....	4
White Linen Rags, No. 1.....	.7 @ 7c
" " No. 2.....	.5 @ 5c
Colored.....	.8 @ 8c
Mixed woolens.....	.2 @ 8c
Soft woolens.....	.6 @ 7c
Gunny bagging.....	.1 @ 2c
Jute Butts.....	.1 @ 1c
Kentucky Bagging.....	.3 @ 8c
Book stock.....	.4 @ 4c
Waste paper and scrap.....	.2 @ 8c
Rope cuttings.....	.1 @ 3c
Kentucky Bale rope.....	.4 @ 4c
Oakum Junk, No. 1.....	.5 @ 5c
" " No. 2.....	.4 @ 4c
Tarred Shaking.....	.4 @ 4c
Grass rope.....	.1 @ 2c
Tarred Shaking.....	.1 @ 2c
Old Metal.	
Copper.....	.27 @ 28
Yellow metal.....	.18 @ 8c
Brass and Composition.....	.18 @ 23
Old lead, solid.....	.6 @ 6c
Tea lead.....	.5c
Wrought Iron.....	.1 @ 1c
Sheet Iron.....	.1 @ 1c
Cast iron.....	.1 @ 1c
Machinery iron.....	.1 @ 1c
Zinc.....	.5c
Pewter, No. 1.....	.26 @ 27
" " No. 2.....	.10 @ 12
Spelter.....	.7

Paints, Oils, etc.**Paints.**

Black, lamp—Coach Painters.....	.7 @ 20c
" " Ordinary.....	.6c
" Ivory Drop fair.....	.15c
" best.....	.26c
Black Paint, in oil.....	kegs, 8c; last'd cans, 11 c
Blue, Prussian, fair to best.....	.50 @ 20c
" " " in oil.....	.35 @ 20c
" Chinese, dry.....	.89c
" Ultimariane.....	.25 @ 20c
Brown, Spanish.....	.1c
" Van Dyke.....	.9c
Carmine, 40.....	.12 @ 20c
Green, Chrome.....	.15 @ 20c
" Paris.....	good, .3c; best, .4c
" In oil.....	.3c; .4c
Mineral Paints.....	.14 @ 4c
Orange Mineral.....	.14 @ 5c
Red Lead, American.....	.95c
" English.....	.10 @ 5c
" Venetian (N. C.) dry.....	.23c
" " " in oil.....	last'd cans, 11c; kegs, 8c
" Indian, dry.....	.10c
Rose Pink.....	.1c
Stenna, American, Haw.....	.4c
" Burnt.....	.45c
" in oil.....	.16 @ 20c
Umber, Burnt.....	.6c
" in oil.....	.16 @ 20c
" Raw.....	.35 @ 20c
" in oil.....	.16 @ 20c
Vermilion, Chinese.....	.45
" Tricote.....	.12c
" American, Common.....	.25c
White Lead, American, dry.....	.11c
White, Paris, Engle's prime.....	in bibs, .25 @ 20c
Yellow Ochre, French.....	.25 @ 20c
" " " in oil.....	last'd cans, 11c; kegs, 8c
" Vermont.....	.15c
" Chrome.....	.17 @ 20c
" in oil.....	.16 @ 20c
Zinc White, American No. 1 dry.....	.9c
" French (Paris).....	.11c
" in oil.....	.12 @ 20c
Oils.	
Linseed Raw.....	.9 gal. casks, 97c; bibs, 98c \$102
" Crude.....	\$102
Whale, Crude.....	"
Blaecuted Winter.....	"
Sperm, Crude.....	"
" Winter unbleached.....	"
Seal, Extra Refined.....	.55c
Lard, Pure Winter.....	.5c
" Spring.....	.5c
Cotton Seed, crude.....	.6c
" Southern Yellow.....	.6c
" White.....	.75c
Nestfoot, Winter.....	.11 @ 10 \$1.15
Natural Lubricating.....	bibls, .6c
Sundries.	
Asphaltum.....	.9c
Benzine.....	.9 gal. 1c
Chalk.....	.15c
" Blister, English.....	.15c
Dryer, Patent, Am'n.....	last'd cans, 10c; kegs, 9c HC; .9c
" English.....	.9c
Flocks.....	.50c
Frothing.....	.50c
Glue, White.....	.33 @ 4c
" Sheet.....	.2c
Glazed Points, Zinc.....	.9c
Gum, Copra.....	.3c
" Damar.....	.3c
" Shellac, English.....	.35c
" dark.....	.4c
Litharge.....	.4c
Funke stone, selected Lumps.....	.4 @ 6c
" powdered.....	.4c
Putty in bladders.....	.5c
Botton Stone, soft, English.....	.8c
Spirits Turpentine.....	.4c
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French Window—1st, 2d, 3d, and 4th qualities. Per box of 50 feet.	
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SIZES.	L. II. III. IV.
6 x 8 to 10 x 15.....	\$107.50 \$89.75 \$90.00 \$82.25
11 x 12 & 12 x 13.....	12.50 12.50 12.50 12.50
10 x 12 to 12 x 20.....	12.50 12.50 12.50 12.50
18 x 22.....	13.25 12.00 10.75 9.50
15 x 26 to 20 x 30.....	15.75 14.00 10.75 10.25
22 x 30 to 24 x 30.....	20.75 18.75 15.75 15.75
25 x 30 to 28 x 34.....	20.75 20.75 15.75 15.75
26 x 36 to 28 x 44.....	22.50 20.75 15.75 15.75
20 x 44 to 30 x 50.....	24.00 21.25 16.75 15.75
30 x 52 to 30 x 54.....	27.25 24.00 18.75 15.75
31 x 56 to 34 x 58.....	28.00 26.25 19.75 15.75
31 x 58 to 34 x 60.....	31.50 29.50 25.00 15.75
35 x 60 to 40 x 60.....	37.00 32.50 29.50 15.75
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SIZES.	L. II. III. IV.
6 x 8 to 10 x 15.....	\$16.00 \$14.00 \$13.50 \$12.50
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10 x 12 to 12 x 20.....	17.25 15.50 14.75 13.25
18 x 22.....	20.00 18.75 15.75 14.25
15 x 26 to 20 x 30.....	24.00 21.00 18.00 15.75
22 x 30 to 24 x 30.....	34.00 31.00 28.00 15.75
25 x 30 to 28 x 34.....	31.00 28.50 21.00 15.75
28 x 40 to 30 x 50.....	36.00 32.50 28.25 15.75
30 x 52 to 30 x 54.....	36.00 32.50 28.25 15.75
30 x 56 to 34 x 58.....	41.00 36.00 28.25 15.75
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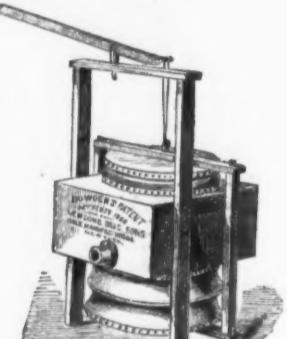
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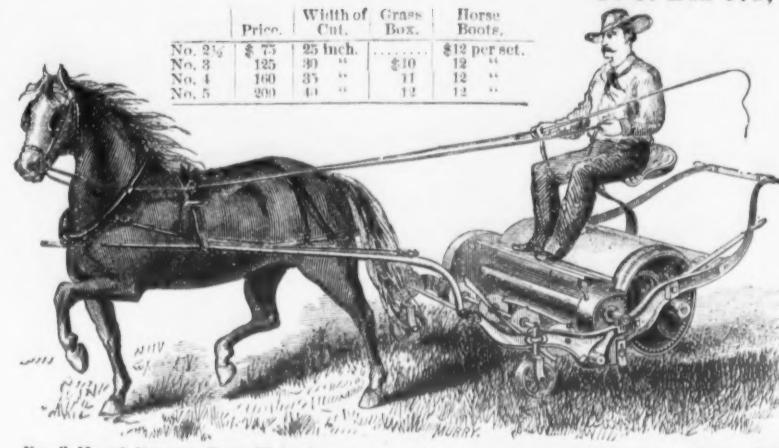
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Price.	Width of Cut.	Grass Box.	Horse Boots.
No. 2½ \$ 75	25 inches.	... \$12 per set.	
No. 3 125	30 "	\$10	12 "
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For Sale by all the leading Hardware, Agricultural Implement and Seed Stores, in this and foreign countries.

Ask for the Excelsior and get the Best.



No. 0 Hand Mower-Cuts 11 inches.	Price, \$16.
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The No. 1 for general use, and warranted. The No. 2 for large lawns—when mowed.

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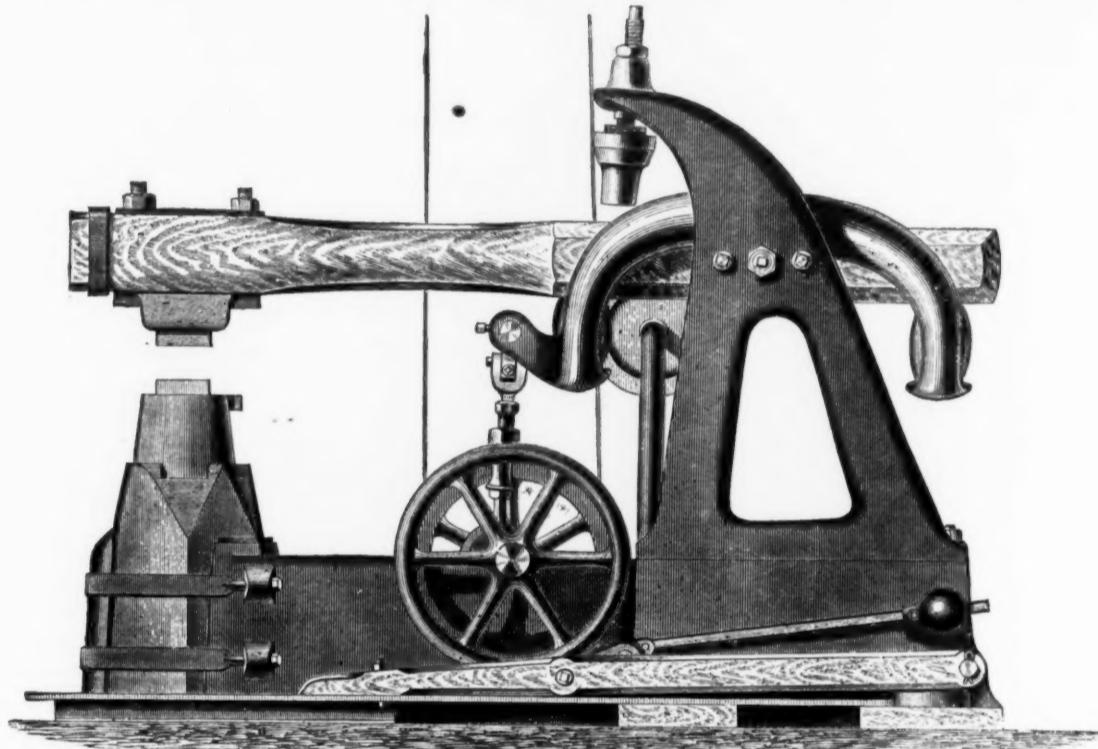
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For description of Mowers, and particulars, send for catalogue. Agents wanted. A liberal discount to the trade.

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This Hammer is a great improvement over the old style of helve hammers. It is all made of Iron and Steel except the helve and cushions. It is portable, takes up but little room, and makes no noise except the stroke of the hammer. It takes less power to drive it, and it turns out more and better work. The helve is nicely balanced upon two adjustable hardened steel centers, and there is no bind or friction connected with its action. It will endure more hardships at less expense for repairs, and, consequently, outlasts any other. Its capacity is greatly increased, but not at the expense of its size, convenience or durability. It strikes a more accurate, forcible and elastic blow than any other hammer. It is being used and is peculiarly adapted for the exceeding difficult work of swedging cotton spindles; no other hammer has been able to do this work as perfectly and economically. It is the favorite of every hammersman; it promptly obeys every touch, and he soon regards it as a thing of life. We warrant them as recommended, and refer you to the following parties now using them:

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**SELDEN PATENT
DIRECT ACTION STEAM PUMP,**

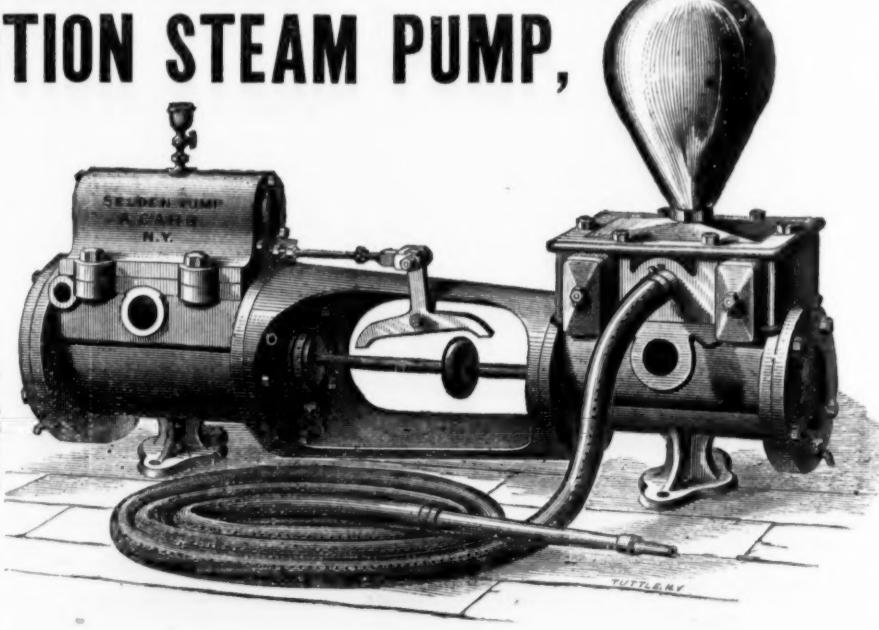
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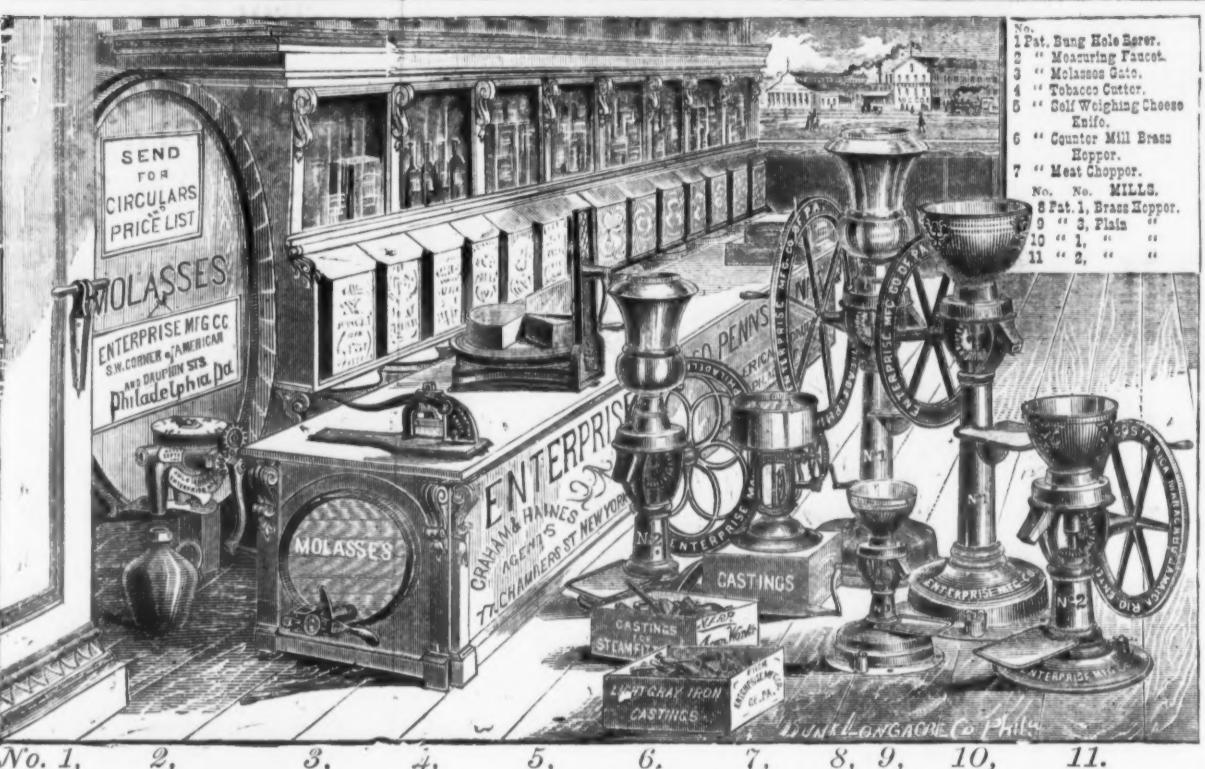
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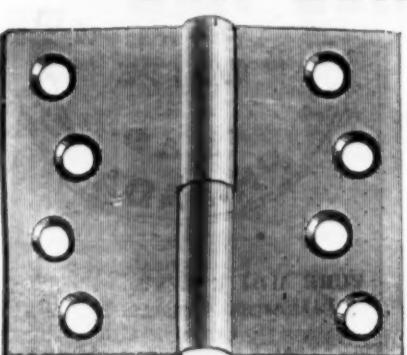
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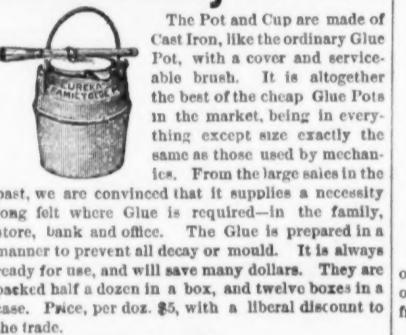


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The Pot and Cup are made of Cast Iron, like the ordinary Glue Pot, with a cover and serviceable brush. It is altogether the best of the cheap Glue Pots in the market, being in every thing except size exactly the same as those used by mechanics. From the large sizes in the past, we are convinced that it supplies a necessity long felt where Glue is required—in the family, store, bank and office. The Glue is prepared in a manner to prevent all decay or mould. It is always ready for use, and will save many dollars. They are packed half a dozen in a box, and twelve boxes in a case. Price, per doz. \$5, with a liberal discount to the trade.

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BUILDERS' HARDWARE,
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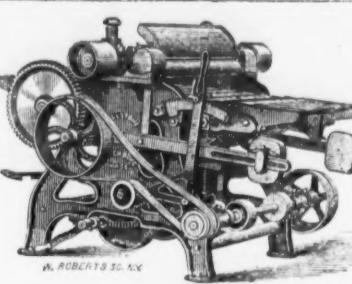
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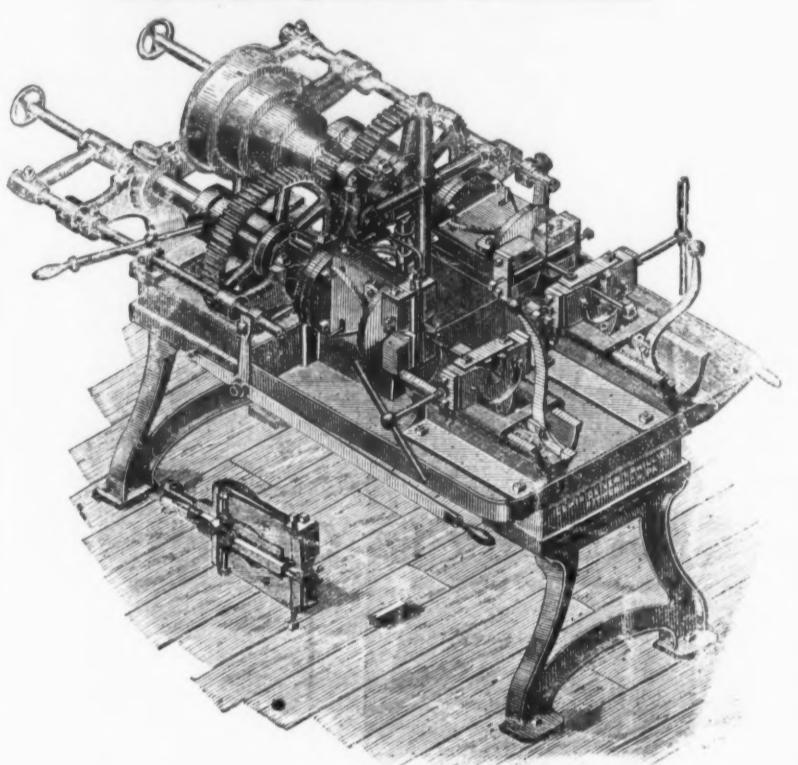
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DOUBLE SCREW CUTTER.



This machine will cut two bolts at once, or cut a bolt and tap nut at same time. It cuts either right or left from 2000 inch to 4500 $\frac{1}{4}$ inch bolts in ten hours. The machine is self-oiling, and the dies are self-opening. Three sizes are made—the largest cutting from $2\frac{1}{4}$ in., the medium from $1\frac{1}{2}$ in., and the smallest from $\frac{1}{2}$ in. down.

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OFFICE OF
KENNEDY BROTHERS & CO.

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To whom it may concern:

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run it can easily head 10,000 bolts per day, or 200,000 per month. We have headed on our ma-
chine in one hour and a quarter 3000 $\frac{1}{4}$ bolts. We cheerfully recommend the machine to any
parties in want of such, as they are indispensable for heading bolts.

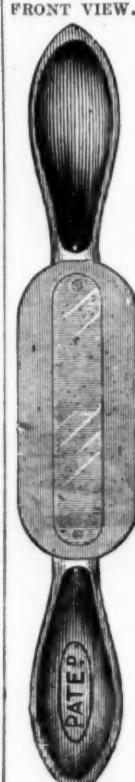
Yours, very truly,

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The above is one of the many Testimonials we are receiving in favor of our Bolt Machinery.
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The Chapin Machine Co.,
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Peter Wright... ... \$12 1/2c
Wilkinson's... ... 11 1/2c
Eagle, 10 lb cents, currency... ... 12 1/2c
Apple Pavers.—*Reading and Turn Table.* per doz \$9 50
Union... ... 8 00
Axes.—*Mann's Light.* ... Per doz. \$13 00 @ 14 1/2c
Hunt's Light... ... 14 00 @ 14 1/2c
Red Indian, all sizes... ... 12 50 @ 13 00
Red Chieftain, all sizes... ... 13 00 @ 13 1/2c
Crown Prince... ... 13 50 @ 14 00
Augers and Auger Bits.—*Pierce's Pat.*
Twist Bits... ... 10 lb 25 c
Bates' & Iv's Bits... ... 10 lb 20 & 10 c
Douglas' Bits... ... 10 lb 30 c
Cook's Bits... ... 10 lb 25 & 10 c
Bonney's Pat. Hollow Augers... ... 10 lb 25 c
Russell Jennings' Bits... ... 10 lb 25 c
Bates' & Iv's Nut Augers... ... 10 lb 20 & 10 c
Doughlass Nut Augers... ... 10 lb 25 c
Watson's Ship Augers... ... 10 lb 25 c
Balances.—*Landers, Frary & Clark's.* ... 10 lb 15 c
Chattillon's... ... 10 lb 15 c
Morton's... ... 10 lb 15 c
Common Spring, with Hook... ... \$1 50 @ 2 00
Bell's.—*Bevins Bros. Mfg. Co., Hand Bells.* ... 10 lb
" Extra Light Hand Bells... ... 10 lb 10 & 5 c
Other makers Light... ... 10 lb 10 @ 60 c
Connell's Door Bells... ... old list net
Western and Kentucky... ... 10 lb 50 c
Boring Machines.—*Bates' Mfg. Co., complete with augers.* ... 10 lb 15 c
Douglas' Mfg. Co., complete with augers... ... 10 lb 15 c
Common Augers... ... 8 25 @ 4 00
Angular, Extra Auger... ... 5 50 @ 5 00
Bolts.—*Eastern Carriage Bolts.*
Western... ... 10 lb 20 & 10 c
Philadelphia... ... 10 lb 40 c
Wrought Shutter Bolts... ... 10 lb 15 c
Cast... ... 10 lb 35 c
Braces.—*Barber's.* ... 10 lb 10 @ 40 c
Barrett's Newmaw's... ... 10 lb 37 1/2 c
Spofford's... ... 10 lb 37 1/2 c
Batts.—*Cast Fast Joint, Narrow.* ... 10 lb 15 c
" Broad... ... 10 lb 40 c
Cast Loose Joint... ... 10 lb 20 & 10 c
Acorn Drifts... ... 10 lb 25 & 10 c
Wrought Loose Pins... ... 10 lb 15 c
" Narrow... ... 10 lb 20 c
Loose Joint... ... 10 lb 20 & 10 c
Barber's Blind Butts... ... 10 lb 40 c
Shepard's Blind Butts... ... 10 lb 35 c
Clark's " " by the case... ... 10 lb 35 & 40 c
Lull & Porter's " " by the case... ... 10 lb 25 & 55 c
Palmer's " " No. 1 for wood... ... 10 lb 30 & 50 c
Garrettson's " " No. 2 for wood... ... 10 lb 25 & 50 c
Chains.—*German Halters.* ... gold list 15 c
Coll. ... gold list 15 c
Galvanized Pump... ... 10 lb 15 c
English Chain less than cask... ... add 10 c to 10 lb
Common Chain... ... 10 lb 15 c
Proof Coat Chain... ... 10 lb 15 c
By the cask, 560 lbs, discount 10c per lb. Common Chain, 10c per lb, less than proof.

Chisels.—*Socket Framing.* ... 10 lb 60 & 5 c
socket Firmer... ... 10 lb 60 & 5 c
Tang... ... 10 lb 10 & 5 c
Beatty's Framing and Firmer... ... 10 lb 10 & 5 c
Casters.—*Porcelain Wheel.* ... 10 lb 10 & 5 c
Iron... ... 10 lb 20 & 10 c
Brass... ... 10 lb 20 & 10 c
Clothes Wringers.—*Universal.* ... per doz \$72 00
Novelty... ... 72 00
Provident... ... 72 00
In lots of 2 dozen, discount \$2 per dozen.
King Wringer (Iron Frame)... ... per doz \$69 00
Coffee Mills.—*Common Box and Side.* ... 10 lb 15 c
Patent Box and Side... ... 10 lb 15 c
Cotter.—American Pocket (best). ... 10 lb 20 & 25 c
Bayley's, Frary & Clark, J. Russell & Co. and Lamson & Goodnow Mfg. Co. Manufacturers' net prices.
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" " ... 10 lb 10 & 5 c
" " ... 10 lb 15 & 5 c
" " ... 10 lb 20 & 10 c
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Nicholson's Bastard... ... 5 00 to 2 cur
" " Taper... ... 5 00 to 2 cur
Butcher's Mill... ... 75 25 to 2 gold
" " Standard... ... 5 50 to 2 gold
" " Taper... ... 5 50 to 2 gold
Moss & Gamble—Mill, Taper and
Bastard... ... 5 50 @ 3 25 to 2 gold
Fluting Machines. ... 10 lb 60 & 5 c
Royal No. 1, 1/2 inch Rollers... ... 10 lb 60 & 5 c
No. 2, 1/2 inch Rollers... ... 10 lb 60 & 5 c
Hammers and Hatchets.
Yerkes & Plumb's... ... 10 lb 10 c
Hammond & Son's... ... 10 lb 10 c
Hinges.—Strap and T. ... 10 lb 30 c
Bonney's No. 1 Gate... ... 10 lb 25 c
" " No. 2 and 3... ... 10 lb 35 c
Horse Nails. ... Nos. 7, 8, 9, 10
Assorted... ... 25 28 29 34 35 36
Globe... ... 25 28 29 34 35 36
Brandage... ... 26 24 23 22 21
Nos. 7, 8, 9, 10
Putnam... ... 22 23 24 25 26 27
On Assable, Globe and Brandage 1000 lb long... ... 10 lb 5 c
Knobs.—*Door (regular manufacturer).*
Porcelain and Mineral... ... 10 lb 40 c
Locks and Latches.—*Rim and Mortise.* ... 10 lb 25 c
Till and Cupboard... ... 10 lb 25 c
American Padlocks... ... 10 lb 40 c
Tombolos... ... 10 lb 25 c
Thumb and Ruggens Latches... ... net @ 10 lb 10 c
Mattocks.—*Long and Short Cutter.* ... 10 lb 15 c
Western Pattern... ... 10 lb 15 c
Pennsylvania Pattern... ... 10 lb 15 c
Molasses Gates.—*Enterprise Mfg. Co.'s Measuring Faucets.* ... 10 lb 20 c
Stainless Gates... ... 10 lb 20 c
Lincoln's " " ... 10 lb 40 & 10 c
Landers, Frary & Clark's Petroleum... ... 10 lb 10 & 10 c
Taylor's Petroleum Faucets... ... 10 lb 20 & 10 c
Rakes.—*Cast Steel Garden.* ... 10 lb 30 c
Wood Head Iron Teeth... ... 10 lb 30 c
Rules.—*Stanley Rule and Level Co.* ... 10 lb 60 & 10 c
Steven's and Hubbard's... ... 10 lb 60 & 10 c
Squares.—*Steel and Iron.* ... new list
Squares.—*Diston's Cross Cut.* ... 10 lb 50 c
Diston's Hand... ... 10 lb 75 c
W. McNeice's H'd. Cross-Cut & Circ't, new list... ... 10 lb 75 c
Boydton's Lighting, new list... ... 10 lb 50 c
Boynton's Plain Back, list Feb. 1873... ... 10 lb 20 c
" Back Strap... ... 10 lb 20 c
Oliver Ames & Sons... ... net list
Nest... ... 10 lb 75 c
Sad Irons.—*Reading (planed face).* ... per lb, 50 c
Cognacock (polished face)... ... 50 c
Steve Polish.—*Gem.* ... 10 lb 50 c
" " ... 10 lb 50 c
Onyx... ... 10 lb 50 c
Satin Polish... ... 10 lb 50 c
Clipper No. 10... ... 10 lb 50 c
Common Scythes... ... per doz \$70 00 @ 10 10 c
Scythes.—*Iron.* ... new list, April 1st, 1873, list 47 c
Brush... ... 10 lb 20 & 10 c
Spoons.—*Plated Spoons, Rogers Bros.* ... 10 lb 25 & 25 c
Britannia, Parker's and Boardman's... ... 10 lb 25 & 25 c
Steven's Silver... ... 10 lb 50 c
German Silver... ... 10 lb 50 c
Troy Scales.—*Diston's.* ... 10 lb 50 c
Stanley Rule and Level Co... ... 10 lb 40 & 10 c
Willis Thrall, No. 2... ... 10 lb 30 c
Willis Thrall, No. 3... ... 10 lb 30 c
Tacks, &c.—*Half Weight Tacks.* ... 10 lb 25 c
Clout and Finishing Nails... ... 10 lb 75 c
Trans.—*Genuine Onondta—Newhouse list.* ... 10 lb 75 c
Imitation... ... 10 lb 20 & 10 c
Wrenches.—*Cast Genuine.* ... 10 lb 20 & 10 c
Crescent Imitation Wrench... ... 10 lb 40 & 10 c
" " ... 10 lb 40 & 10 c
" " ... 10 lb 40 & 10 c
(Kellogg) Malleable Bar... ... 10 lb 50 c
Tata Wrought Bar... ... 60 c
Tata Malleable Bar... ... 60 c
Wire... ... 10 lb 20 & 10 c
No. 19 to 26... ... 10 lb 27 & 10 c
No. 27 to 36... ... 10 lb 33 1/2 c @ 25 c
Coppered 0 to 12... ... 10 lb 15 c
Tinned Broom Wire... ... 10 lb 15 c

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July 12, 1873.

Axes, Chopping.—*Francis Axe Co.* ... \$13 00 @ 14 50
Augers, G. S. " " ... 10 lb 10 & 5 c
Bite Angles.—*Pierce's.* ... 10 lb 10 & 5 c
Jennings... ... 10 lb 10 & 5 c
Bells, Cow.—*Yar's Genuine.* ... 10 lb 20 c
Bows—*Smitlin's.* ... 10 lb 20 c
Braces, Bits, Barber's... ... 10 lb 10 & 5 c
Brads, Cut, etc., Broach, Patent, new... ... 10 lb 50 & 7 1/2 c
Butts—Brass... ... 10 lb 10 & 5 c
Cast Loose Joint... ... 10 lb 40 c
" " Pin... ... 10 lb 40 c
" " Silver Tipped... ... 10 lb 30 c
Wrought Narrow... ... 10 lb 10 & 5 c
Broad, Loose Joint... ... 10 lb 20 & 10 c
Table and Back Flaps... ... 10 lb 10 & 5 c
Wrought Butts, Loose Pin... ... 10 lb 15 c

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Manufacturers of Copper, Brass, and Iron Rivets; German and Swedish Iron, Leathered Carpet, Lace and Gim. Tacks; Finishing Hungarian, Tin, Clout and Cigar Box Nails; Rivets made to Order.

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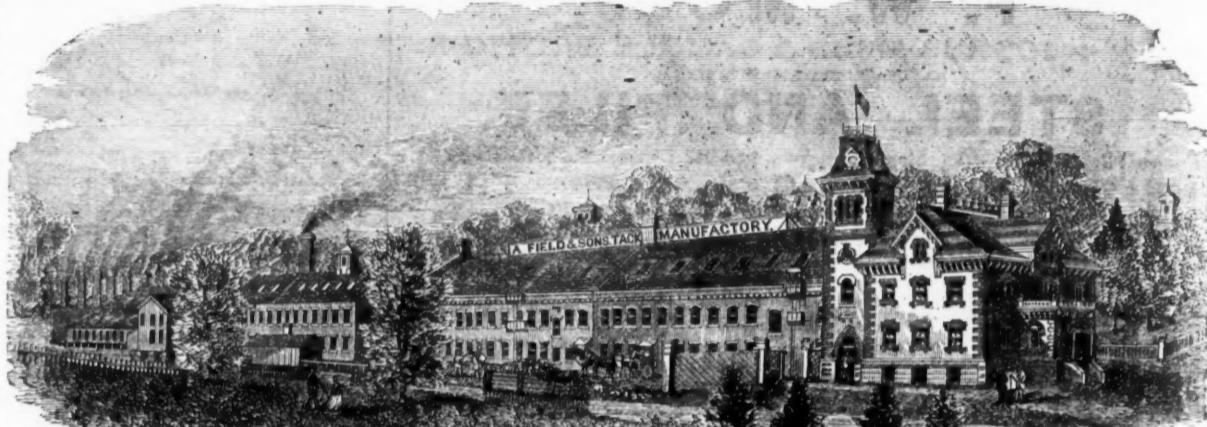
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BRUSH, LACE AND GIMP TACKS,
Leathered, Tinned, and Iron Carpet Tacks; Finishing, Black, and Tinned Trunk Nails; Hungarian and Cigar Box Nails; Rivets; Copper Points, Iron, Steel, Copper, Zinc and Brass Shoe Nails; **COPPER HEAD PLATES, STEEL SHANKS, and FANCY HEAD NAILS, SILVER OR JAPANNED LINING AND SADDLE NAILS.**

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Copper and Iron Tacks, Tinned Tacks,

SUPERIOR SWEDES IRON TACKS, for Upholsterers' Use, Saddlers' Supply, Card Clothing, etc., etc.

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Copper and Iron Boat Nails, Patent Copper Plated Tacks and Nails, Fine Two Penny and Three Penny Nails, Channel, Cigar Box and Chair Nails, Leathered Carpet Tacks

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Any variations from the regular size or shape of the above named goods made from samples, to order.

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L. B. Taylor's Patent Speed Indicator.

To ascertain the number of revolutions made by a shaft in any given time: Take the Indicator by the handle in the right hand, holding your watch in the left. Press the point of the spindle gently against the end and center of the shaft. To every hundred revolutions of the shaft the Hundred Pointer will make one revolution, while the Thousand Pointer will indicate one number, the dial being marked into ten parts. It may be applied to a shaft revolving either to the right or left.



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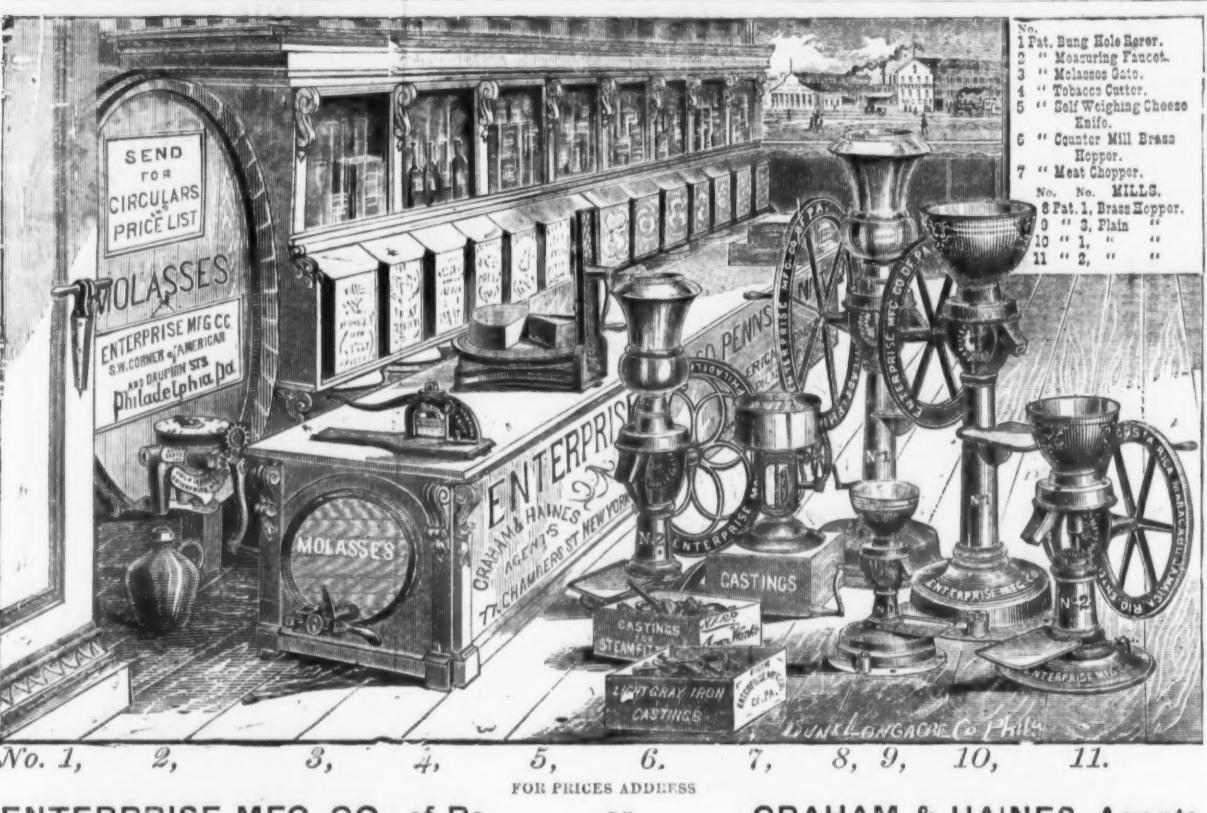
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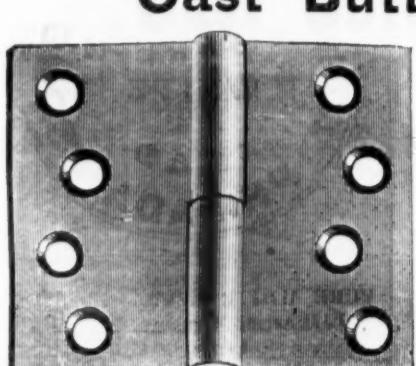
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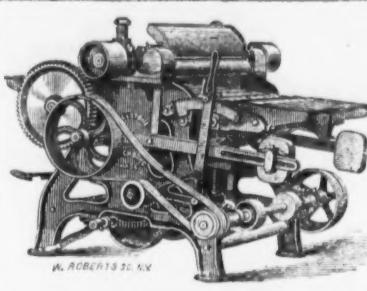
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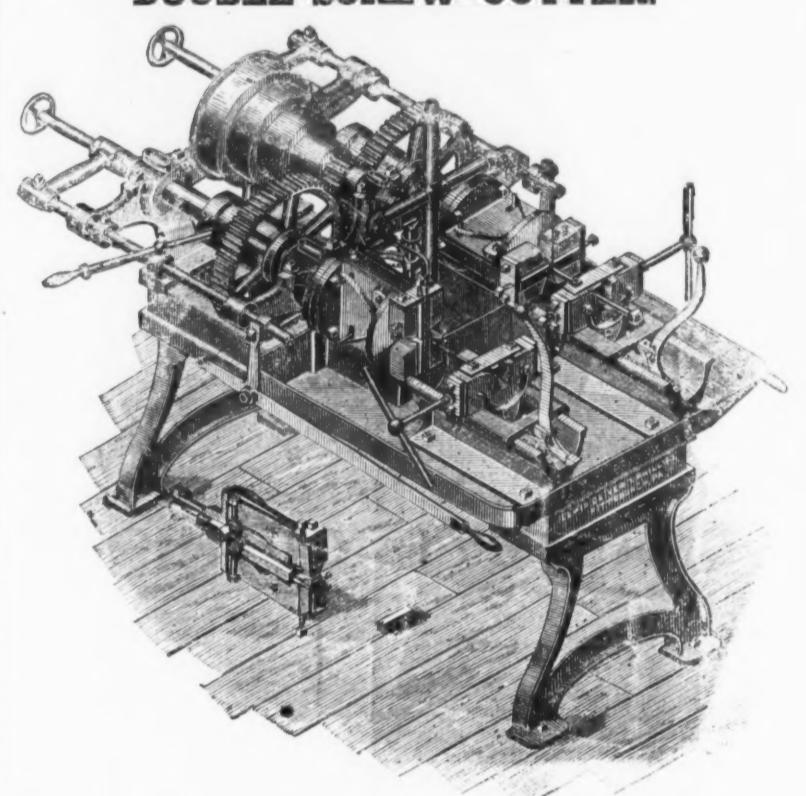


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This machine will cut two bolts at once, or cut a bolt and tap nut at same time. It cuts either right or left from 2000 inch to 4500 $\frac{1}{4}$ inch bolts in ten hours. The machine is self-oiling, and the dies are self-opening. Three sizes are made—the largest cutting from $2\frac{1}{4}$ in., the medium from $1\frac{1}{2}$ in., and the smallest from $\frac{1}{2}$ in. down.

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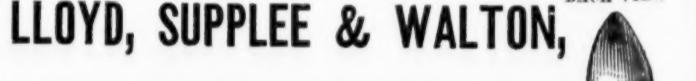
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Peter Wright's.	per lb. gold, 13 1/2	Beaters Egg, "Peerless"	dia 30 @ 30¢ 5	Fence Pickets	% round, bent to shape, 30 x 1 ft. of fence, less 5% off net
Wilkinson's.	11 1/2	Brick Bath (box of 200) Best English	per doz. \$4 50	Carriage and Tire Bolts (new list).	60¢ 15% off net
Eagle, 8 1/2 cents, currency.	11 1/2	Burner—Fender	dia 20 1/2	Plow Bolts	25% off net
Apple Pavers.—Reading and Turn Table, per doz \$8 50	Union.	Chalk—White, Carpenter's	per gross, 60¢	Steve Bolts	at the list price
Axes.—Mann's Light.	per doz. \$13 00	Red, Carpenter's	80¢	Machinist and Square Head Bolts	25% off net
Hunt's Light.	14 00 @ 14 50	Blue, Carpenter's	90¢	Machine and Lag Screws	25% off net
Red Indian, all sizes.	12 00 @ 13 00	Crayon School	100¢	Bolt Ends	25% off net
Red Chieftain, all sizes.	13 00 @ 13 00	Framing Socket	dia 60 @ 60¢ 10 1/2	Pat. Hot Pressed Square and Hexagon Nuts	25% off net
Crown Prince.	13 00 @ 14 00	Corner Socket Chisel	dia 60 @ 60¢ 10 1/2	Washers, all made from new band iron	25% off net
Anglers and Auger Bits.—Pierce's Pat.	per doz. 8 00	Castings—Malleable	dia 60 @ 60¢ 10 1/2	Washers, sizes, from 3/16 to 2 in., 6¢ c p off net	large sizes, from 1/4 to 2 in., 4¢ c p off net
Twist Bits.	dia 20 @ 23 1/2	Cutting Seeders	per doz. \$4 50	Washers, all made from new band iron	Washers, sizes, from 3/16 to 2 in., 5¢ c p off net
Bates' & Iv's Bits.	dia 20@12 1/2	Elbowa—Corrugated	5 5/8 6 7	Nuts and Washers in lots less than one kg each size, 1¢ c p off net	Nuts and Washers in lots of 100 lb. boxes, 1¢ c p off net
Doublous' Bits.	dia 30 1/2	Funnel Black and Galvanized	new list net	Washers, lots less than one kg each size, 1¢ c p off net	Washers, lots of 100 lb. boxes, 1¢ c p off net
Cook's Bits.	dia 25 & 10 1/2	Fancy Black and Helmet	new list net	Washers, all made from new band iron	Nuts and Washers in lots of 100 lb. boxes, 1¢ c p off net
Bonney's Pat.—Hollow Augers.	dia 25 1/2	Hammers—Maypole's	new list net	Washers, sizes, from 3/16 to 2 in., 5¢ c p off net	Nuts and Washers in lots less than one kg each size, 1¢ c p off net
Russell Jennings' Bits.	dia 10 1/2	Yester	new list net	Washers, all made from new band iron	Washers, sizes, from 3/16 to 2 in., 6¢ c p off net
Bates' & Iron Nut Augers.	dia 20 1/2	Hooks and Staples—Wrought	new list net	Washers, sizes, from 3/16 to 2 in., 7¢ c p off net	Washers, sizes, from 3/16 to 2 in., 8¢ c p off net
Douglas' Nut Augers.	dia 30 1/2	Hoops—Belt	new list net	Nuts and Washers in lots less than one kg each size, 1¢ c p off net	Nuts and Washers in lots of 100 lb. boxes, 1¢ c p off net
Watkins' Ship Augers.	dia 30 1/2	Plane—Pewter	new list net	Washers, all made from new band iron	Washers, sizes, from 3/16 to 2 in., 8¢ c p off net
Walrus' Landers, Frary & Clark's.	dia 10 @ 15 1/2	Packings—Rubber	dia 20 1/2	Washers, sizes, from 3/16 to 2 in., 9¢ c p off net	Washers, sizes, from 3/16 to 2 in., 10¢ c p off net
Chatillon's.	dia 10 @ 15 1/2	Pencils, Slate—Soapstone	dia 5 6 1/2	Washers, sizes, from 3/16 to 2 in., 10¢ c p off net	Washers, sizes, from 3/16 to 2 in., 11¢ c p off net
Morton's.	dia 10 @ 15 1/2	Pegs—Wooden	dia 5 6 1/2	Washers, sizes, from 3/16 to 2 in., 11¢ c p off net	Washers, sizes, from 3/16 to 2 in., 12¢ c p off net
Common Spring, with Hook.	\$2 00 @ 2 00	Potato—Peeler	dia 20 1/2	Screw Hook and Eye Hinges, 8 to 1 in. diam, 4¢ c p off net	Washers, sizes, from 3/16 to 2 in., 12¢ c p off net
Bells.—Bavin Bros. Mfg. Co. Hand Bells.	dia 50 @ 5 00	Radial—	dia 20 1/2	Strap and T Hinges	30¢ off net, delivered
" Extra Light Hand Bells.	dia 50 @ 5 00	" Radiant	dia 20 1/2	Drop and Treen Irons	\$16 00 \$12 00
Other makers' light.	dia 50 @ 5 00	No. 75 100 150	dia 17 1/2	Cast Iron Washers	1¢ c p off net
Connell's Door Bells.	old list net	"	dia 20 1/2	Bridge and Roof Bolts	1¢ c p off net
Western and Kentucky.	dia 50 %	"	dia 20 1/2	1 to 2 in. diam, over 8 ft. long.	8¢ c p off net
Boring Machines.—Bates' Mfg. Co., com-	plete with augers.	"	dia 20 1/2	1 to 2 in. diam, over 8 ft. long.	9¢ c p off net
Douglas' Mfg. Co., complete with augers.	dia 10 @ 15 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Common Augers.	\$4 25 @ 4 00	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Augers, Extra Auger.	5 50 @ 5 00	"	dia 20 1/2	1 to 2 in. diam, over 4 ft. long.	6¢ c p off net
Bolts.—Eastern Carriage Bolts.	dia 60 @ 6 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Western.	dia 60 @ 6 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Philadelphia.	dia 40 %	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Wrought Shutter Bolts.	dia 35 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Cast.	dia 35 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Buckles.—Barber's.	dia 30 @ 10 40	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Bartolomeow's.	dia 30 @ 10 40	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Spofford's.	dia 30 @ 10 40	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Bufts.—Cast Fast Joint, Narrow.	dia 15 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Cast Loose Joint.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Acorn Drilled.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Wrought Loose Pin.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Double Hinged and Bass Fins.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
" Narrow.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Loose Joint.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Parker's Blind Butts.	dia 35 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Spofford's.	dia 35 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Bufts.—Cast Fast Joint, Narrow.	dia 15 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Cast Loose Joint.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Acorn Drilled.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Wrought Loose Pin.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Double Hinged and Bass Fins.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
" Narrow.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Loose Joint.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Parker's Blind Butts.	dia 35 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Spofford's.	dia 35 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Bufts.—Cast Fast Joint, Narrow.	dia 15 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Cast Loose Joint.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Acorn Drilled.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Wrought Loose Pin.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Double Hinged and Bass Fins.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
" Narrow.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Loose Joint.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Parker's Blind Butts.	dia 35 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
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Bufts.—Cast Fast Joint, Narrow.	dia 15 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Cast Loose Joint.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Acorn Drilled.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Wrought Loose Pin.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Double Hinged and Bass Fins.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
" Narrow.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Loose Joint.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Parker's Blind Butts.	dia 35 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Spofford's.	dia 35 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Bufts.—Cast Fast Joint, Narrow.	dia 15 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Cast Loose Joint.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Acorn Drilled.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Wrought Loose Pin.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Double Hinged and Bass Fins.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
" Narrow.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Loose Joint.	dia 20 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Parker's Blind Butts.	dia 35 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Spofford's.	dia 35 1/2	"	dia 20 1/2	1 to 2 in. diam, from 1 1/2 to 4 ft. long.	6¢ c p off net
Bufts.—Cast Fast Joint, Narrow					

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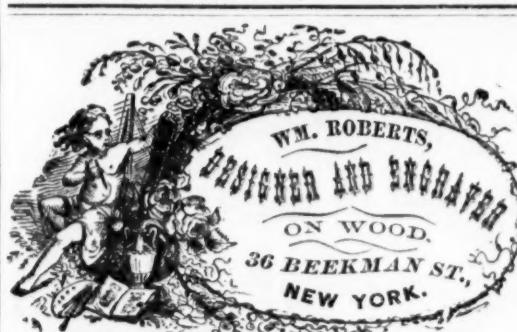
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No. 22 to 24	8¢ c
No. 26	6½¢ c
No. 28	8¢ c
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Iron Wire	11½¢ c
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IX, 10x14.....16 25	Copper Bottoms.....80½¢ c
IX, 10x14.....19 00	Pinnished Copper—
IX, 10x14.....16 75	Sheathing, 14x48.....46¢ c
IX, 12x12.....16 75	Bitter Zinc.....46¢ c
IX, 14x20.....14 50	" " " " ".....46¢ c
IX, 14x20.....17 25	No. 8.....46¢ c
IX, 14x20.....17 50	No. 9.....48¢ c
X, 14x20.....22 75	Pig Tin.....2½¢ c
X, X, 14x20.....25 50	Large Pig.....29¢ c
X, X, X, 14x20.....25 50	Small Pig.....40¢ c
X, X, X, 14x20.....25 50	Bars.....41¢ c
X, X, X, 14x20.....25 50	Solder.....2½¢ c
X, X, X, 14x20.....25 50	Brass.....42¢ c
X, X, X, 14x20.....25 50	Bright Wire.....dis 2½¢ c
X, X, X, 14x20.....25 50	Sheet Iron—
X, X, X, 14x20.....25 50	Large Plate.....18 50
X, X, X, 14x20.....25 50	No. 18 Am. Com.....8 c
X, X, X, 14x20.....25 50	No. 20 Am. Com.....10 c
X, X, X, 14x20.....25 50	No. 22 Am. Com.....12 c
X, X, X, 14x20.....25 50	No. 24, 26 & 28.....14 c
X, X, X, 14x20.....25 50	No. 26 Wood's Co.'s Sheet
X, X, X, 14x20.....25 50	IRON
X, X, X, 14x20.....25 50	No. 15 to 20 Smooth #15
X, X, X, 14x20.....25 50	21 to 24.....7 25
X, X, X, 14x20.....25 50	25 to 28.....8 25
X, X, X, 14x20.....25 50	29 & 30.....9 05
X, X, X, 14x20.....25 50	Sheet Zinc, Any width.....10½¢ c

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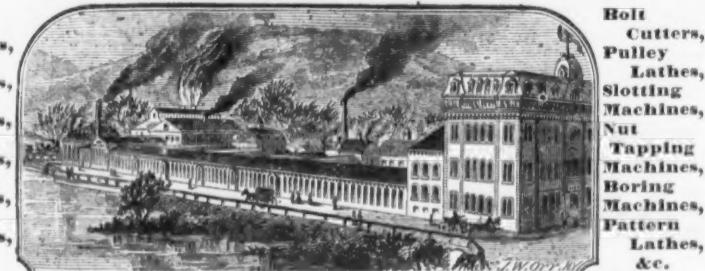
Tin Plate. —1. 10x14 Charcoal.....\$14 00 @ \$15 00	Copper—
IX, 10x14.....12 50	Sheathing.....87½¢ c
IX, 10x14.....13 00	Copper Bottoms.....80½¢ c
IX, 10x14.....13 50	Pinnished Copper—
IX, 10x14.....13 50	Sheathing, 14x48.....46¢ c
IX, 10x14.....13 50	Bitter Zinc.....46¢ c
IX, 10x14.....13 50	" " " " ".....46¢ c
IX, 10x14.....13 50	No. 8.....46¢ c
IX, 10x14.....13 50	No. 9

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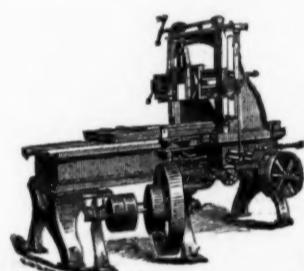
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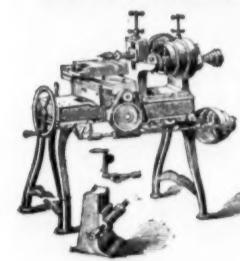
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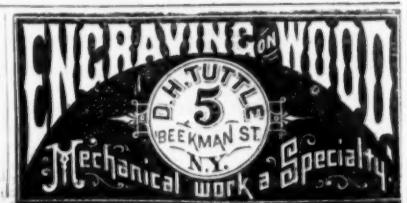
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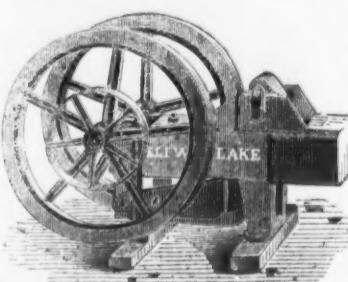


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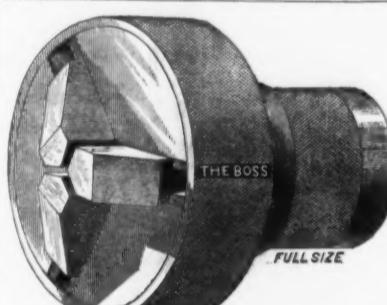
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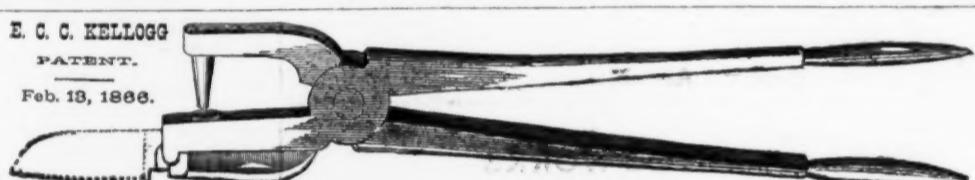
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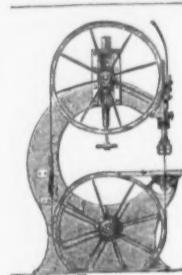
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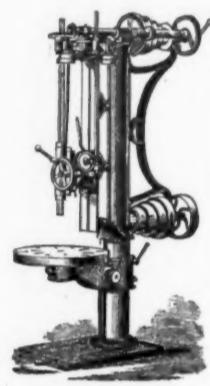
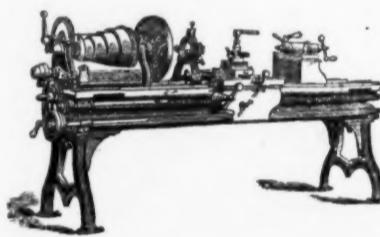
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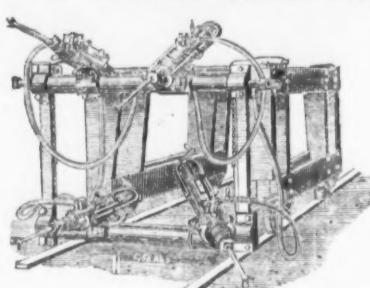
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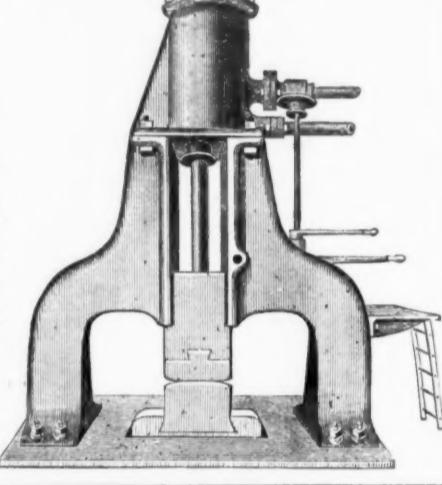
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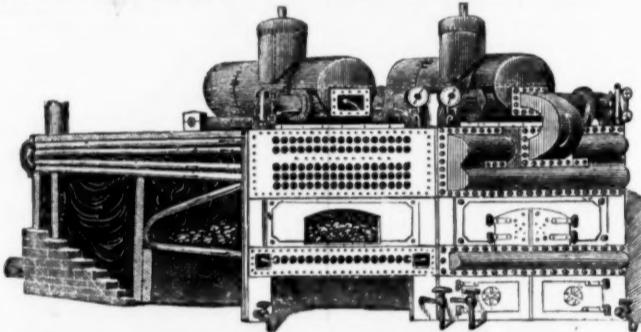
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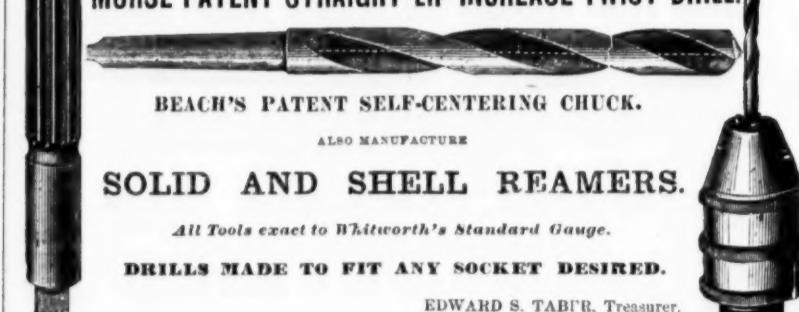
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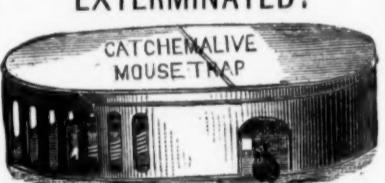
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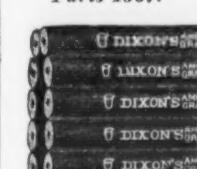
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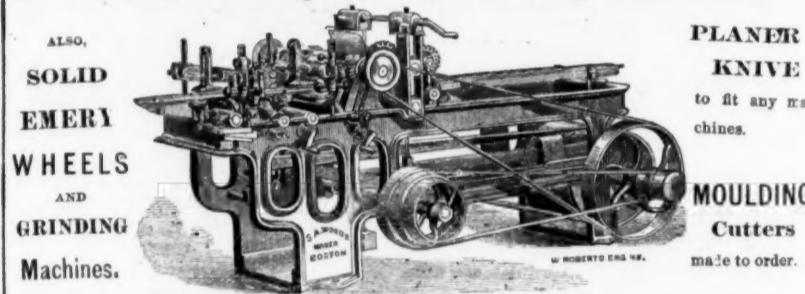
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